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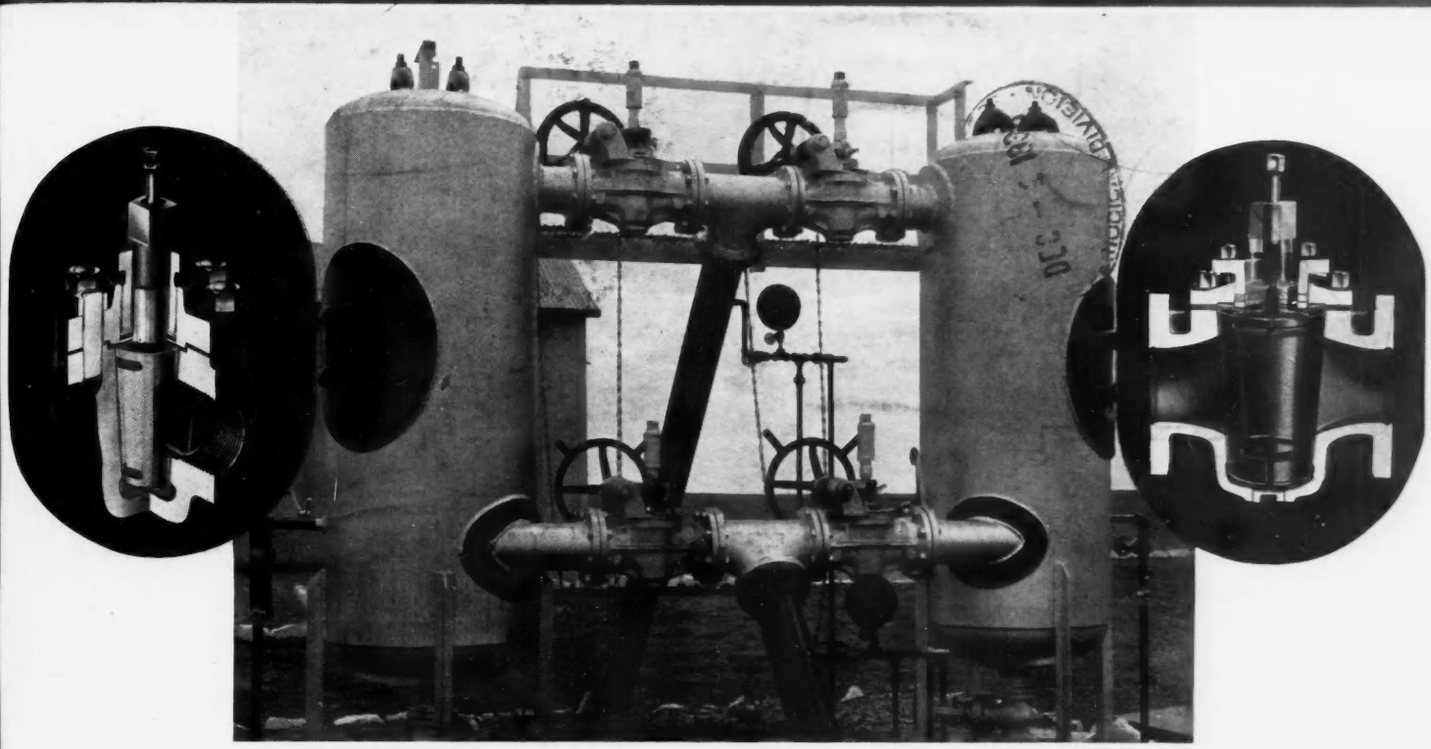
The OIL WEEKLY

OIL and GAS ENGINEERING

FOR OIL AND GAS PRODUCERS AND PIPE LINE MEN

THE WEEK'S NEWS INTERPRETED



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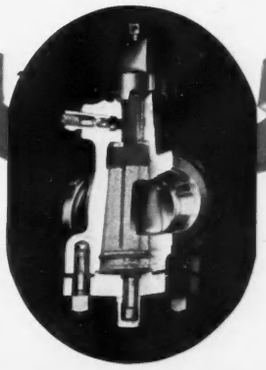

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VOLUME 83 NOVEMBER 16, 1936 NUMBER 10

BENJAMIN FRANKLIN TAUGHT THEM THRIFT...

A Man of Many Talents

Benjamin Franklin, the "Apostle of Thrift," crowded into his lifetime enough activities to keep several industrious men busy. He became famous as printer and publisher, author, educator, inventor, scientist, diplomat, statesman, and philanthropist.

Franklin was 17 years old when he ran away from home, arriving at Philadelphia in 1723 with only $1.25 in his pocket. He got a job as a printer, drew cartoons for his newspaper, and also found time to play the harp, guitar and violin. Through his political writings Franklin exerted a powerful influence on the infant republic, making the Colonists realize the importance of gaining their independence from England. He was regarded as the No. 1 citizen of the Pennsylvania colony, and later was appointed first U. S. Ambassador to France. In Europe, his ability to speak several foreign languages and his wide knowledge of world affairs made him a welcome guest in the palaces of kings. Returning to Pennsylvania, Franklin published and edited a magazine from which he made a substantial fortune. He founded hospitals, libraries and a great university.

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The people of Pennsylvania learned the lesson of thrift from their fellow citizen, Benjamin Franklin. Over 200 years ago he urged them to invest their money wisely—to get a dollar's worth of value for each dollar spent. Today, thrift is a habit with Pennsylvanians, and in drilling for oil they practice thrift by using UNION Wire Lines.

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The photograph was taken at Well 22, Haines Lease, Venango County, Pennsylvania, drilled by the Brundred Oil Corporation. The men, left to right, are: G. E. Exley, Sup't.; Charles E. Rogers, driller; H. D. Brown, Jr., Ass't. Sup't.; A. R. Rodgers, tool dresser; J. E. Humphrey, Union Wire Rope Corp.; C. L. York, shooter; P. H. Sawyer, Jr., visitor.

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And when you come out of the hole my blades always *close surely and safely*, and you're all set to carry on. You will find then that I've done the almost impossible at a cost so low you will hardly believe it.

Braggin' a little? You bet I'm braggin' a lot, but I can back it up any time. Brother, will you take a dare?

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THE OIL WEEKLY

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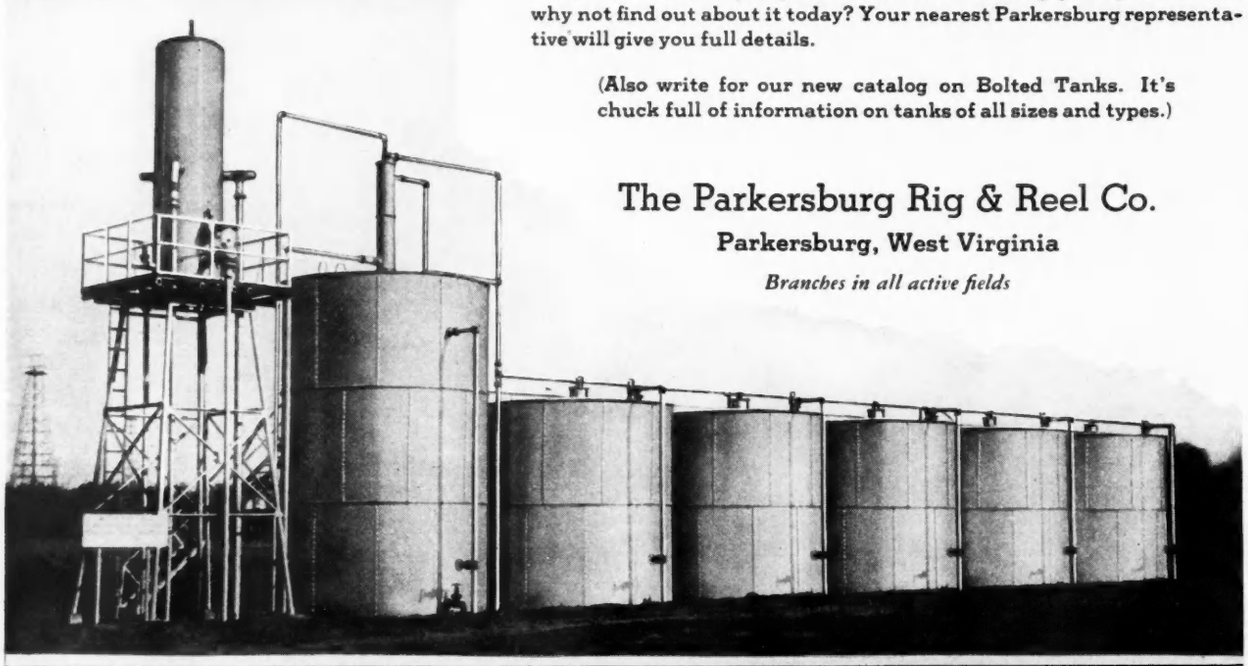

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THE OIL WEEKLY

FOR OIL AND GAS PRODUCERS
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ENGINEERING NEWS STATISTICS

WARREN L. BAKER, Editor

This Week:

CAUTION and confidence marked the seventeenth annual meeting of the American Petroleum Institute in Chicago November 9 to 12, inclusive. Confidence came out of knowledge that strides toward economic and scientific recovery have been made. Caution was urged because of known hazards yet to be hurdled. Samuel Pettengill's speech was one of the high spots of the convention. He left a warning to the industry to the effect that the trend toward regimentation is such that it may sweep the entire world. **Page 8.**

OKLAHOMA had her Seminole. Not to be outdone, especially in the oil field line, Texas now is offering her Seminole. It is in West Texas, in the county of Gaines. This Texas Seminole became established last week as a commercial oil field, when wildcat began flowing oil from Permian lime at 5022 feet. The strike has more than ordinary significance. It is in a virgin region, north of the established West Texas fields and east of the New Mexico state line. From the older fields of Crane and Upton Counties, West Texas operators have pushed northward, finding several fields in Andrews County and now this one in Gaines, the next county to the north. The strike also represents another boost for geophysics, as the Seminole structure was outlined by seismograph work. **Page 68.**

IF some one got up at a meeting of a dairy men's association and brought up the question, "What is milk?" somebody else would start paging a psychopathic doctor. But at an oil men's meeting it's different. Bring up the question, "What is petroleum?" and some hundreds of learned men will echo, "Yes, what is it?" This question, so elemental yet so abstruse, was among those that came up for consideration at the American Petroleum Institute meeting at Chicago last week. One answer was offered in a paper that was presented. **Page 9.**

DEXTROSE has been developed as a tracer material for measuring the contamination of core samples by water from drilling muds. Its use along with other quantitative methods for determining the oil and connate-water content of sands adds considerable to the literature available on this comparatively new subject. Results of a thorough study of conditions in wells shows an average of 38 percent of the effective pore space of oil sands is occupied by connate water. **Page 46.**

A STUDY of the gas-cap material in the Kettleman Hills field indicates that a mixture of the samples in the same proportions as would correspond to the operating gas-oil ratio of the well sampled, when brought to equilibrium at conditions of temperature and pressure comparable to those probably existing in the gas-cap sands, would be substantially all in the form of a gas phase. These are the conclusions coming from an intensive investigation in which gas-cap material was obtained in the form of gas and liquid samples, and each subjected to six different mixtures and studied at a series of pressures and temperatures. **Page 19.**

RODESSA started off as a North Louisiana field. But it is developing into an important Texas field, too. Among the 89 wells now drilling at Rodessa, 63 are on the Texas side of the state line and 26 are on the Louisiana side. **Page 77.**

A REVIEW of the present practice for determining the capacities of derricks, and a study of results obtained in tests, shows that there is a discrepancy in the existing A.P.I. column formulas. As a result there is need for further investigation for the purpose of evolving a more correct method of rating derricks so that the derrick's safe load capacities will be commensurate with the strength of the leg sections. **Page 33.**

Next Week:

FOR the purpose of determining if the Gulf Coast geologic zones and formations have enough petrographical or physical characteristics to permit them to be identified, an extensive study of component minerals and physical properties of sands from seven producing horizons has been made. The first of a series of seven articles on this important subject will be published. The value of the articles are enhanced greatly by the abundant usage of illustrations that show histograms and photomicrographs of each section studied.

IN recent years, operators of shallow wells have realized pumping economies through adoption of a new reboring cycle for standard plunger-liner pumps with metal-to-metal seal. Moreover, changes in the method of handling such equipment in the field have reduced operating difficulties materially, and hence costs. Don E. Schnobrich will explain the factors that brought about these changes and discuss the new practices and methods now available in an article that will add a valuable chapter to the series on care and maintenance now being published.

SEVERAL simple innovations or changes in design will materially improve the effectiveness of pipe line scrapers used in removing paraffin from lines. It has been proved that intentionally by-passing some of the oil through the scraper will carry the loosened material ahead and thus keep the scraper blades clear. Installation of a third or supplemental leather on small diameter scrapers will prevent them from hanging up in gate valves. How these two improvements may be made through easy and simple additional scraper features will be told next week.

Caution and Confidence

KEYNOTES OF SEVENTEENTH ANNUAL A.P.I. GATHERING IN CHICAGO

By GRADY TRIPLETT, Staff Writer

CHICAGO.

CONFIDENCE and caution marked the seventeenth annual meeting of the American Petroleum Institute, November 9, 10, 11 and 12.

Confidence came out of the realization that the industry is making strides in economic recovery as well as scientific recovery. Caution was urged because of known hazards as well as memory of a condition of chaos only a few years back.

AXTELL J. BYLES
Re-elected President of the American Petroleum Institute.

So far as conservation is concerned, the Interstate Oil Compact stands in high favor with the Institute. It was urged as permanent legislation by Axtell J. Byles, institute president, as well as by Colonel E. O. Thompson, chairman of the Interstate Oil Compact Commission. A permanent status for the Connally act also found favor with speakers.

Pettengill's Speech High Spot

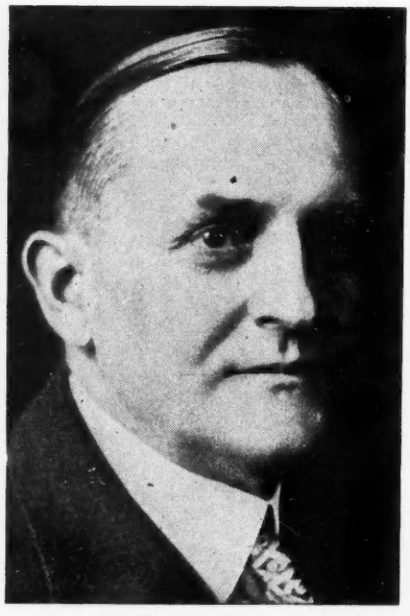
The high spot of the meeting was the speech by Samuel B. Pettengill, congressman from the third district of Indiana, who spoke on "Free Enterprise in America." He left a warning to all industry to the effect that the trend toward regimentation is such that it may sweep the world.

"I am not at all certain," he admitted, "that the whirl toward the center has not gathered momentum that nothing can check until a disillusioned people have once more had their bellyfull of Caesar."

And in case of a loss of the privilege of free enterprise he charged its defeat to industry with: "I believe the final judgment of the impartial historian will be that free enterprise died in the house of its friends, its death wound given by its beneficiaries, not by its foes."

As proof that industry has had a hand in urging regimentation he cited this:

"What bill in recent years had more of the essence of collectivism, the destruction of states' rights, the regimentation of enterprise than the Thomas-Disney bill, which would, if enacted, give an official in Washington the power to fix the daily production of petroleum from every well in America and therefore, the income of the owner and the price paid by the buyer? Again without discussing the merits of necessity for the bill, is the simple truth that it was the representatives of the industry itself who rushed to Washington crying, 'Oh, Beneficient Bureaucrats! Oh, Excellent Ickes; Oh, Marvelous Margold! Uncontaminated as you are with any knowledge of problems of petroleum, and with that high detachment and objective viewpoint resulting from never having seen an oil well, save us ere we perish, save us from ourselves'!"



W. R. BOYD
who has served efficiently in the past, again is the Institute's Executive Vice President.

Pettengill urged industry to work for the solution of its problems rather than rushing to Washington for legislation after defeats (which would be corrected in times of prosperity), have brought disaster. He cited many instances of abuse of business privilege. As for a method of solution, he left this thought:

"Although I can not demonstrate it on a blackboard, I have a feeling, as compelling as a religious conviction, that if industry will constantly pass on to the worker and the customer all the savings of labor saving machinery and invention, rather than siphon them off into the pools of watered securities, it will be that process which will keep distribution and production in balance and go as far toward Utopia as our poor human natures will go or be driven."

[*Continued on page 62*]

GEORGE A. HILL, JR.
President of Houston Oil Company, will serve as Vice President of production.

Axtell Byles Re-elected

LEOVY IS MADE CHAIRMAN OF A. P. I. EXECUTIVE COMMITTEE

CHICAGO.

AXTELL J. BYLES, New York, was re-elected president of the American Petroleum Institute at the seventeenth annual meeting in Chicago. All other officers returned to their posts with the exception of Jacob France, Mid-Continent Petroleum Corporation, Tulsa, who was succeeded as vice president for refining by W. S. S. Rodgers of The Texas Company, New York.

F. A. Leovy, Gulf Oil Corporation, Pittsburgh, Pennsylvania, was elected chairman of the executive committee. D. E. Buchanan, Hanlon-Buchanan, Incorporated, Tulsa, was re-elected chairman of the committee on membership.

The entire membership of the American Petroleum Industries committee was re-elected.

New officers of the institute are: Axtell J. Byles, president; K. R. Kingsburty, Standard Oil Company (California), San Francisco, vice president at large; George A. Hill, Jr., Houston Oil Company of Texas, Houston, vice president for production; W. S. S. Rodgers, The Texas Company, New York, vice president for refining; and C. E. Arnott, Socony-Vacuum Oil Company, Incorporated, New York, vice president for marketing.

W. R. Boyd, Jr., was re-elected executive vice president, and O. D. Donnell, Ohio Oil Company, Findlay, Ohio, was re-elected treasurer. Lacey Walker, Teanock, New Jersey, was re-elected secretary and assistant treasurer, and John S. Cooke of Hoboken, New Jersey, was re-elected assistant secretary.

New Executive Committee

Members of the new executive committee are: F. A. Leovy, Gulf Oil Corporation, Pittsburgh, Pennsylvania, chairman; J. Howard Pew, Sun Oil Company, Philadelphia; E. G. Seubert, Standard Oil Company (Indiana), Chicago; H. F. Sinclair, Consolidated Oil Corporation, New York; W. C. Teagle, Standard Oil Company (New Jersey), New York; and R. G. A. van der

Members of the committee on membership are: D. E. Buchanan, Hanlon-Buchanan, Incorporated, Tulsa, chairman; R. A. Broomfield, Barnsdall Oil Company of California, Los Angeles; Woude, Shell Union Oil Corporation, New York, who succeeds J. C. Van Eck. E. J. Bullock, Standard Oil Company (Indiana), Chicago; W. H. Ferguson, Continental Oil Company, Denver; and J. L. Hamon, Hamon & Cox, Dallas.

K. R. KINGSBURY
Standard Oil Company of California, was given the title of Vice President at Large.

O. D. DONNELL
Ohio Oil Company, remains custodian of the Institute's funds.

W. S. S. RODGERS
The Texas Company, succeeds C. E. Arnott as Vice President for refining.

Members of the American Petroleum Industries committee are: Harry T. Klein, The Texas Company, New York; Edwin S. Hall, Standard Oil Company (New Jersey), New York; James J. Cosgrove, Continental Oil Company, Ponca City; Paul M. Gregg, Union Oil Company of California, Los Angeles; W. J. Guthrie, Gulf Refining Company, Pittsburgh; G. V. Holton, Socony-Vacuum Oil Company, Incorporated, New York; W. A. McAfee, Standard Oil Company (Ohio), Cleveland; and R. T. Osborn, Sinclair Refining Company, New York.

The membership of the American Petroleum Institute Board of Directors was increased to 105, plus 2 members ex officio, by action of the directors and of the Board of Councillors. Nine new

[*Continued on page 62*]

PRACTICAL APPLICATION OF
Fundamental Research
INTERESTS A.P.I. DIVISION OF PRODUCTION

By WARREN L. BAKER, Editor

CHICAGO

THE Division of Production of the American Petroleum Institute held four group sessions during the Seventeenth Annual Meeting, and materials, fundamental research, drilling and producing practices were the subjects discussed at the various meetings.

The age-old controversy over alleged discrepancies between the claims salesmen make for the products they sell and the actual performance of the products in use came up for discussion in a paper by William Howard Clapp, California Institute of Technology, Pasadena, California, who presented a paper on "The Relation of Mechanical Testing to Steel Performance."

Would Rate Steel on Dependability

Pointing out that while steel salesmen frequently stress the superior mechanical properties of their brands of machinery steel, but in practice entirely different factors are found to be the real test, Clapp advocated the rating of various steels on a basis of dependability in which a high co-efficient of dependability would correspond to a narrow range of variation in properties. The necessity of drilling oil wells to depths of two miles, and the possibility of pumping oil that distance, is forcing equipment closer to the limits of performance, he said, and mechanical properties are not absolute standards of performance. He recommended the collection of data concerning the spread of test values so as to establish reliable and positive information as to dependability.

Vanadium steels are meeting the demands of the petroleum industry for extremes of service both in oil-producing and refining operations, Jerome Strauss and A. W. Demmler, of the Vanadium Corporation of America, Bridgeville, Pennsylvania, told the Division of Production group session in their paper, "Vanadium Steels in the Oil Industry." They said the petroleum industry's purchases represent an appreciable percentage of all-industry consumption, and explained the uses of steel in operating the more than 275,000 pumping oil wells in the United States. Refinery equipment and operation calls for the use of steels capable of withstanding temperatures from 75 degrees below zero Fahrenheit to more than 1400 degrees above zero, they said, with pressures ranging from partial vacuum to 2000 pounds, or more, per square inch. No small number of metals can meet all the needs, they asserted, explaining the increasing number of uses to which vanadium steels and alloys were now being put.

Role of Molybdenum

Application of molybdenum to modern oil well drilling and oil-production equipment was described by John E. Wilson, of Climax Molybdenum Company, Los Angeles, who said the trend toward greater depths has necessitated extensive improvements in the characteristics of metals used, with corrosion as an additional hazard. Modification of design has helped to some extent, he said, but is limited in application, and consequently it has been necessary to use alloys to give all needed benefits without creating disadvantages. He explained that alloys of molybdenum are receiving rapid recognition because of noticeable improvements they make in steel and cast iron, adding that these alloys accentuate most properties of the metals without detracting seriously from any of them.

LACEY WALKER
Teanock, New Jersey, drew no snap as the Secretary and Assistant Treasurer-Elect of the Institute.

The Division of Production held one group session Wednesday at which progress on fundamental research projects of the Institute were given. Fred E. Wood, Standard Oil Company (Indiana), was the presiding officer.

Study of Oil Source Beds

Four characteristics of sediments give promise of being definitely helpful in recognizing source beds of petroleum, and one of them is particularly encouraging, it was reported by Parker D. Trask and H. Whitman Patnode.

Trask, who is associated with the U. S. Geological Survey at Washington, D. C., and Patnode, who is the Institute's research associate at the survey, have been engaged in efforts made both by the survey and the Institute to determine methods of recognizing and evaluating oil source beds in advance of drilling and development. Seeking particularly to determine whether a relationship exists between certain characteristics of sediments and the ability of sediments to generate oil, they reported that of the eight established characteristics, the four known as volatility, degree of volatility, carbon-nitrogen ratio, and nitrogen-reduction ratio, give promise of being useful means of recognizing source beds. The nitrogen-reduction ratio is particularly encouraging, they added, but further studies are necessary before it is of economic value to the industry.

Analysis of samples of gases and liquids taken from oil-producing areas is helpful in determining the extent of oil reserves and also the relative merits of various methods of producing oil and gas, it was reported by B. H. Sage and W. N. Lacey, California Institute of Technology, Pasadena. Their report presented progress made in an Institute research project.

What Is Petroleum?

What is petroleum and how was it created by Nature? That question, which has been agitating scientists for generations and which has been the subject of numerous research activities, was put before a group session of Division of Production Wednesday. One answer came from Lewis A. Thayer of Centenary College of Louisiana, Shreveport, formerly research fellow of the Institute, who presented a paper supporting the theory of the biogenesis of petroleum.

Thayer discussed the Engler-Hofer theory of the transformation of organic material into petroleum by purely

[*Continued on page 60*]

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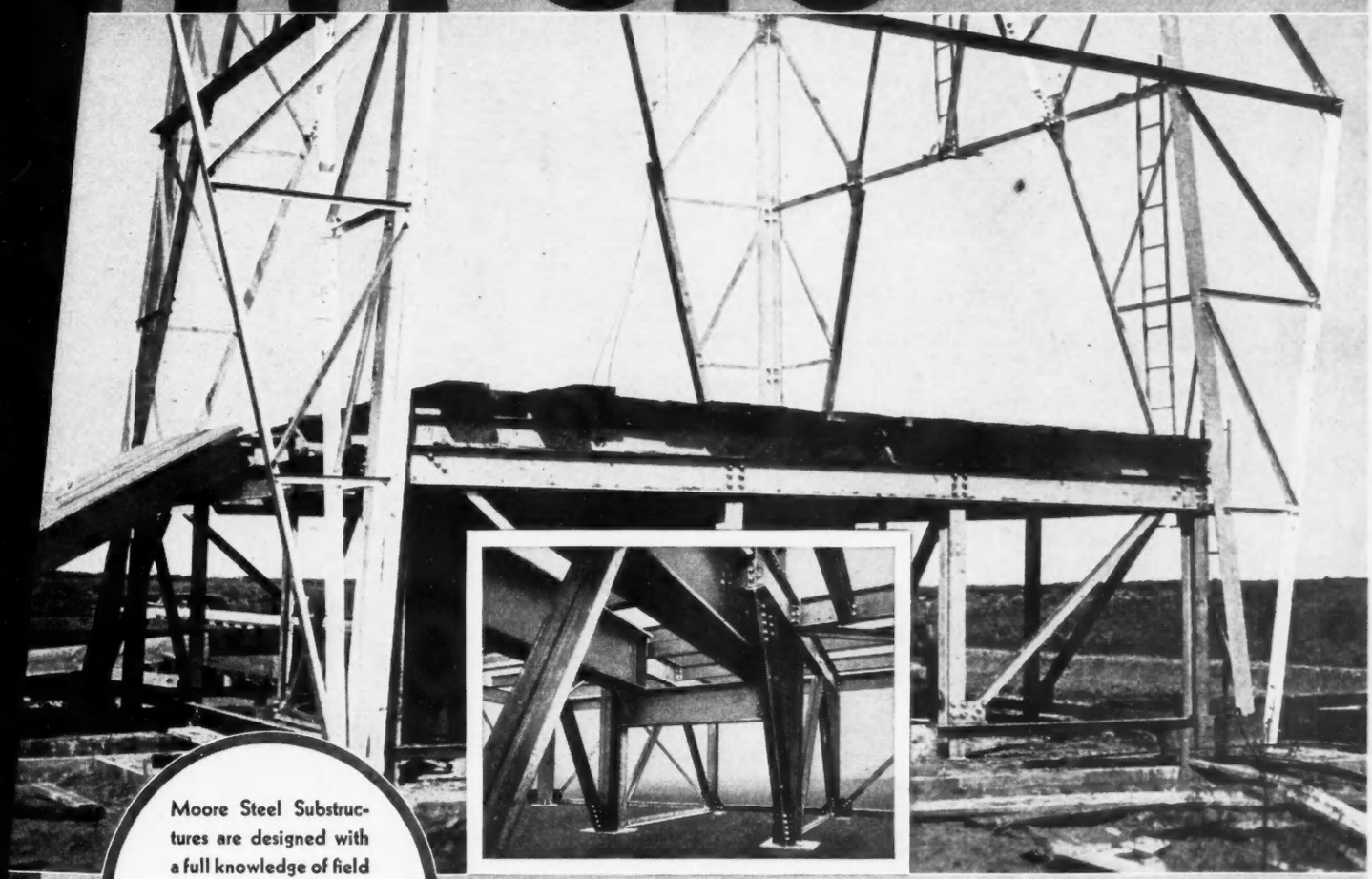

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Progress Is Made

COMMITTEES COVER ALL PHASES OF PRODUCTION PROBLEMS AND PRACTICES

By BRAD MILLS, Associate Editor

COMMITTEE meetings were heavily attended during the four-day session and an unusually large number of recommendations were made. The committee work covered all phases of production problems and practices, and both manufacturers of equipment and operators shared in the discussion. Considerable work had been done prior to the open meetings, and previous recommendations were considered.

A joint meeting of the Special Study Committee on Allocation of Production and the Special Study Committee on Well Spacing was held Monday morning, with M. Albertson, Shell Oil Corporation, presiding. It was pointed out that the well spacing problem as it now stands is deadlocked in some districts, and particularly in California.

T. V. Moore, Humble Oil & Refining Company, stated his company was coring the entire sand body in the Anahuac, Texas, field to determine the water content of the zone, particularly in the vicinity of the water table.

Use Oil Base Mud

Carl Reistle told of a number of wells that have been drilled in the East Texas field in an experimental manner with oil base mud. These wells were drilled in an attempt to determine the points at which water or oil become free moving fluids. Wells drilled entirely through the sand will be used to study water encroachment. In both of the above cases, oil base mud gave better core recoveries than ordinary oil and did not seem to have the disintegration action shown by mud.

One member advanced the theory that pressure maintenance in high pressure flush fields must be considered in spacing of wells. Some fields in the future will be pressure maintained while being depleted. It was further contended that density of spacing of wells within certain limits may not affect ultimate recovery, but time must be considered as an important factor.

In Oklahoma City a sharp reduction in the rate of oil production caused the gas/oil ratio to increase rapidly, and ultimately the wells produced only gas. Such a condition also existed in wells with tubing near bottom. The gas managed to break through the fluid and exert enough back pressure in the tubing to kill the well.

A number of wells at Kettleman Hills showed a marked increase in the gas/oil ratio as production rate changed. The trouble was corrected by running a packer on tubing and producing from near the bottom of the producing zone. This field produces from a great thickness of producing formations that is regarded as one zone.

Average Fields as Basis

One member pointed out that the committee had been accustomed to discuss or consider unusual rather than ordinary or typical fields when discussing the well spacing problem. The most logical method of attack, it was claimed, should be based on conditions in the average field. The heart of the well spacing problem lies in its practical application in average fields.

Well spacing and ultimate recovery are not as closely related as ordinarily believed, T. V. Moore stated. He added that it doesn't matter whether 50 or 100 wells are drilled since the field will be drained in either case. In the average water drive, gas cap field, one well or 100 wells will eventually get the oil. He added that there are many exceptions to this rule, however.

Some of the Oklahoma City operators took exceptions to the statement that development of one side of a field necessarily drains both sides. Developments had shown, it was claimed, that drainage from the north end of the field was negligible while the south end was under development, although the first wells completed in the north end of the field indicated a formation pressure of less than 600 pounds. Indications were that the oil was not drained from the north end of the field, despite the great loss in formation pressure during the heavy withdrawals of oil from the south end. The heavy movement of gas and loss of formation pressure apparently were not accompanied by an appreciable movement of oil. There was a belief among some, however, that the oil replaced the gas in the upper part of the formation and that flowing energy was lost.

Mass Flow: Pressure

Harold Miller, U. S. Bureau of Mines, stated that the mass rate of flow in oil wells appears to be roughly proportional to the pressure, where water drive fields are concerned. He stated that his department had been attempting to determine the most efficient rate of well flow.

The joint meeting of the Topical Committee on Production Practice, F. W. Floyd, presiding, and the Topical Committee on Drilling Practice, with J. T. Hayward as chairman, attracted wide interest.

The early discussion centered on the advisability of considering the productivity index under petroleum technology or production practice. The subject might fall under either classification.

It was pointed out that the U. S. Bureau of Mines now is doing some work along this line in the Fitts, Oklahoma, pool, and it was proposed that one of the men doing the work should write a paper on the progress made. Complaint was made by a member that enough practical data has not been advanced. Fred Wood, Standard Oil Company of Indiana, suggested that an engineer be appointed to determine the present status of productivity index by correlating all available information. The author also should report the practicability of the productivity index.

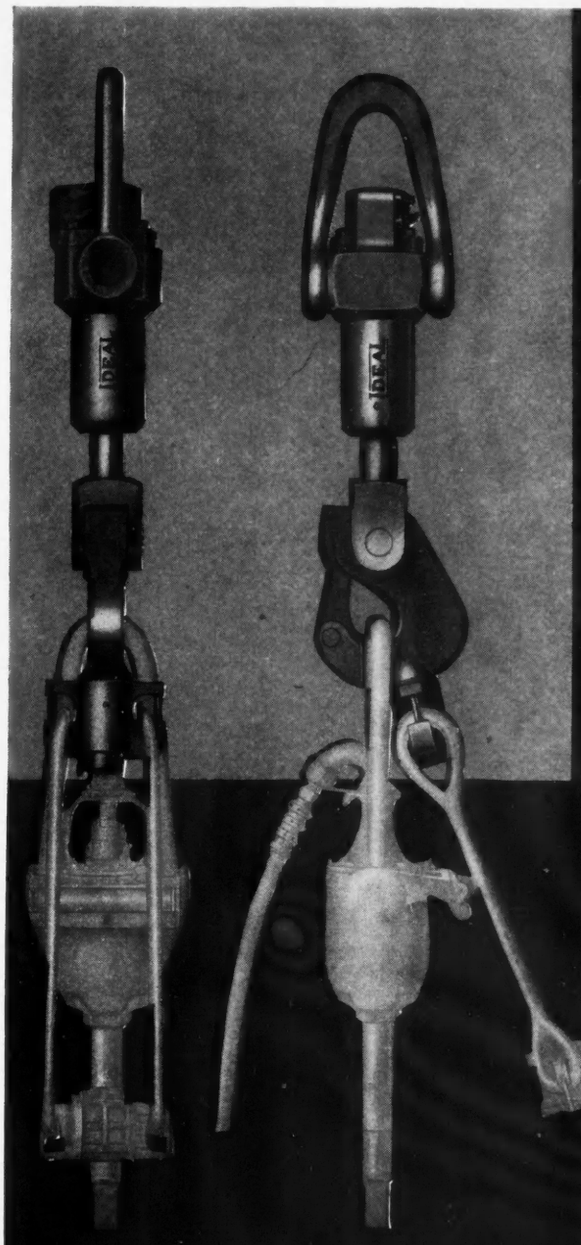
Replies to questionnaires on pumping conditions at Oklahoma City were read by the chairman, F. W. Floyd. The committee suggested that a paper be written covering pumping data submitted by Oklahoma City operators. The answers gave data on operating costs, amount of water lifted, size of rods and tubing, and fluid level.

It was disclosed that at Oklahoma City the fluid level in many wells is less than 100 feet from bottom and the bottom hole pressure less than 100 pounds, yet it is possible to obtain a production of more than 200 barrel hours for short periods on gas lift. In no other American field does such a condition exist.

Handling Rotary Mud

The report of a special committee recommended a number of practices in the handling of rotary mud, Carl Reistle, chairman of this committee, read the report, which recommended the use of the hydrometer in weighing mud in the field; taking of mud sample at the flow line and suction; use of a Stormer viscosimeter in laboratory work; funnel in the field; and a designation of "1200 inches" when giving the weight of the mud. The latter recommendation simply means that the pressure exerted by a 100-foot vertical column of the mud should be shown. Methods of determining the gel strength and the "PH" value of mud were discussed. The "PH" value applies to the relative alkalinity or acidity of the mud.

J. E. Brantly stated that perhaps 90 percent of all wells could be drilled with one standard drilling contract form. He added that with from one to four addi-



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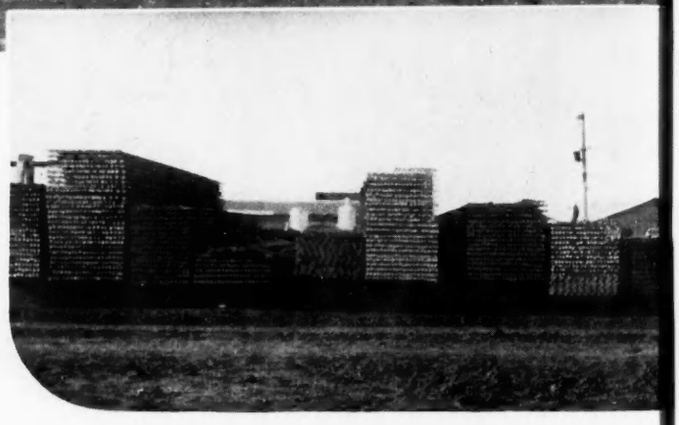

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MEN IN THE INDUSTRY'S NEWS

LIEUT. R. F. BRADLEY, San Francisco, member of Standard Oil Company of Indiana's specification board, was credited last week with making the fastest trip from Manila, Philippine Islands, to Chicago ever accomplished by a business man. The trip from Honolulu to Chicago, 4331 miles, was made in 32 hours. Bradley also made the round trip from Chicago to Manila in 15 days. The distance is 17,885 miles.

CLARK ELDER, chief engineer, Venezuela Gulf Oil Company, has returned to Maracaibo after a two months' vacation in the United States.

W. B. CASE of the New York office of Shell Union Oil Corporation is making a tour of the Shell producing properties in California, and will return to New York shortly before Thanksgiving.

HUGH DONNAN, executive department, and Francis S. Adams, scout and statistician of Cia. Mexicana de Petroleo "El Aguila" S.A. at Tampico, Mexico, are in the United States on vacation.

DR. DAVID SCHENCK JACOBUS, head of the engineering department of Babcock & Wilcox Company, will be awarded the Morehead medal November 18 at the opening session of International Acetylene Association's convention in St. Louis for his leadership in the formulation of codes and procedures which have made fusion welding acceptable.

JOHN A. HANNA, executive department, Mexican Gulf Oil Company, Tampico, Mexico, is recuperating in Houston, following an operation.

PAUL D. CRAWFORD was the speaker at the weekly meeting of the Houston Geological Society November 12, discussing field technique of the magnetometer and its uses in locating serpentine plugs.

SHAPLEIGH GRAY, The Texas Company, was elected president of the Shreveport Geological Society at the November meeting. H. K. Shearer of H. L. Hunt, Incorporated, was made vice president, and C. R. McKnight of Arkansas-Louisiana Gas Company, secretary-treasurer. Gray succeeds C. L. Moody of Ohio Oil Company as president. Guest speaker at the meeting was M. C. Israelsky of Houston.

T. C. PATTERSON has been appointed head of the land department of Arkansas-Louisiana Gas Company, succeeding Herscell Scivally, who resigned to enter business for himself.

GEORGE M. BEVIER, Houston geologist, recently added $15,000 to his initial gift of $10,000 to the University of Pittsburgh School of Mines, from which he graduated in 1913.

P. H. TURNBULL, assistant division petroleum engineer for Humble Oil & Refining Company at Tyler, Texas, has been transferred to the Flour Bluff district for the same operators.

NEXT YEAR'S A. P. I.

Chicago was selected as the meeting place for the eighteenth annual meeting of the American Petroleum Institute, which will be held November 9, 10, 11 and 12, 1937.

The mid-year meeting will be held in Colorado Springs on June 1, 2 and 3, 1937.

Dates for the annual meeting are from Tuesday through Friday, rather than from Monday through Thursday, as has been the custom in the past. This was done to provide another day for committee meetings. The dates for the Colorado Springs meetings are Tuesday, Wednesday and Thursday.

M. M. KORNFELD, consulting micropaleontologist and subsurface geologist, is now located at the Second National Bank Building in Houston. He was formerly employed by United Gas System and Shell Petroleum Corporation paleontological departments in Houston.

"RED" FIDDLER, Tide Water Oil Company, Houston, has been transferred to the West Texas district as scout.

DR. GUS DYER, economist of Vanderbilt University, Nashville, Tennessee, will be the guest speaker at the annual meeting of the Mid-Continent Oil and Gas Association of Texas to be held December 4 at the Lamar hotel, Houston.

The Oil Man's Calendar

NOV. 20	Mid-Continent Oil & Gas Association, Kansas-Oklahoma Division, Tulsa, Oklahoma.
20–21	Society of Petroleum Geophysicists, Houston, Texas.
NOV. 30–	American Society of Mechanical Engineers, Annual Meeting, Society's Building, New York.
NOV. 30– DEC. 1	Independent Petroleum Association of America, Biltmore Hotel, Oklahoma City, Oklahoma.
1	Interstate Oil-Compact Commission Oklahoma City, Oklahoma
DEC. 4	Mid-Continent Oil and Gas Association, Texas Division, Annual Meeting, Houston, Texas.
5–13	First International Consumers Petroleum Exposition, Detroit, Michigan.
15	Mid-Continent Oil & Gas Association, Annual Meeting of General Board of Directors, Tulsa, Oklahoma.

IRVING C. TARLER, New York, has been appointed manager of specialty sales of Alliance Oil Corporation, according to an announcement by Leonard C. Quackenbush, president of the Alliance Oil Corporation and director of the British Alliance Oil Corporation, Ltd., of London. Tarler, formerly managerial representative in East and South Africa for The Texas Company, has been in the petroleum industry 21 years. During the World War he served in the oil branch of the United States government as a chief of division on oil purchasing and inspection. He has been eastern representative of the Standard Oil Company of Indiana with headquarters in New York for 14 years, in which capacity he served until joining the Alliance Oil Corporation on November 4.

R. E. CLARKE, assistant secretary and treasurer of Standard Oil Company of Indiana, was awarded on November 9 a gold pin symbolizing 30 years of service. He joined the company in 1906 as a stenographer, and was auditor of the manufacturing department and general auditor before being promoted to his present position in 1924.

I. J. Shields, manager of the Duluth, Minnesota, division of Standard Oil, and Claude L. Bailey, manager of the Huron, South Dakota, division, also received 30-year service pins.

OSCAR B. FRANKS, cashier, Venezuela Gulf Oil Company, Maracaibo, is seriously ill in a hospital in Houston.

E. A. SALRIN, vice president, Tide Water Oil Company, Houston, spent the past week in Chicago, attending the A. P. I. convention.

GEORGE S. BERRY, assistant district landman for Sinclair Prairie Oil Company, Houston, has been transferred to Fort Worth, where he will be in the division land department.

WILLIAM S. FARISH, JR., production department, Navarro Oil Company, Houston, is engaged to Miss Phyllis Brewster of New York, it was announced November 6. He is the son of the chairman of the board of Standard Oil Company of New Jersey.

ROY A. SILENT, age 46 years, prominent in petroleum engineering circles in California for a number of years, died the morning of November 11 at a Los Angeles hospital, following an operation performed 10 days ago. He is survived by his widow and two daughters.

Mr. Silent was born in Los Angeles July 1, 1890, and was a graduate of the University of California, class of 1913. He was a member of the American Petroleum Institute and of the American Society of Mechanical Engineers, and at the time of his death was chief engineer for the Petroleum Securities Company, a company organized by the late Edward Doheny. Silent for several years served as chief engineer for the Doheny Stone Drill Company, now known as the Hydril Company.

INDUSTRY INVITED

Council for industrial progress to hold meet

WASHINGTON, D. C.

INVITATIONS to attend the second annual meeting of the National Council for Industrial Progress, sponsored by Major George L. Berry, President Roosevelt's co-ordinator for industrial conference, were this week sent to members of the oil industry and to other groups which were asked to participate last year in the revival of N.R.A. principles. The meeting will be held December 10 and 11.

The conference last year drew a heavy attendance, but was split by dissension almost immediately by Berry's alleged "steam roller" tactics, and the representatives of all of the major industries refused to participate, leaving only representatives of labor and a small group of independents from a few minor trades, who organized the council.

In view of the unfortunate experience last year, it is not anticipated that the forthcoming conference will draw much attendance from among the important industries.

The paramount business of the meetings, Berry said, will be the formulation of a program of industrial legislation. Industrialists who have remained from the council and those who have severely criticized it, he said, will be forgiven and welcomed in "friendly spirit" if they attend.

"The problems which will come before us are those which vitally affect all industry," he said. "They cover the operations of raw materials producers, the great manufacturing corporations, and finally reach through distributive processes to the corner grocery and the crossroads general store."

The first day of the conference will be devoted to addresses by Berry and other leaders in the movement. The second day will be given over to executive sessions of the industry council, which will receive and pass upon reports from the committee set up last year to consider national industrial policy; hours and wages; fair trade practices; internal and external competition; anti-trust laws; financial aid to small enterprise, and government competition with private enterprise.

A new committee to study taxation and its effect upon enterprise and employment will hold its first meeting.

DYER WILL SPEAK

Mid-Continent Oil & Gas meet to be December 4

Dallas.—Mid-Continent Oil & Gas Association of Texas will hold its annual convention at Houston December 4. Oil operators from all sections of the state are sending in advance reservations, according to Jake L. Hamon, president of the association, indicating an unusually large attendance this year.

The business session will be held in the main ballroom of the Lamar Hotel, Friday morning, for which an interesting program has been arranged. A feature of the program will be an address by Dr. Gus Dyer, economist of Vanderbilt University, Nashville, Tennessee. Several members of the association who hase performed outstanding service in behalf of the Texas oil industry will receive distinguished service awards, presented by J. D. Collett, president of the General Mid-Continent Oil & Gas Association, and George A. Hill, Jr., president of the Houston Oil Company.

SUPPLIERS ELECT

W. J. Morris of Dallas heads equipment men

Chicago.—At a meeting of the American Petroleum Equipment Suppliers Association held Wednesday in connection with the seventeenth annual meeting of the American Petroleum Institute, W. J. Morris, Continental Supply Company, Dallas, was elected president. John M. Crawford, Parkersburg Rig & Reel Company, Parkersburg, West Virginia, was elected vice president, and Wharton Weems, Houston, was re-elected executive secretary and counsel.

At the meeting the following directors also were elected: Frederick F. Murray, Oil Well Supply Company; John Geismar, National Supply Company; John M. Crawford, Parkersburg Rig & Reel Company; Perry C. Jones, S. M. Jones Company; Donald W. Mackie, Bradford Supply Company; Jerry McJunkin, McJunkin Supply Company; J. A. Crawford, Republic Supply Company (California); E. S. Dulin, Byron-Jackson Company; D. S. Faulkner, National Supply Company; F. C. Merritt, Elliott Core Drill Company; E. M. Smith, Emsco Derrick Company; Lester H. Keim, Oil Well Supply Company; L. F. Baash, Baash-Ross Tool Company; G. A. Axelson, Axelson Manufacturing Company; W. L. Childs, Reed Roller Bit Company; T. T. Word, T. T. Word Supply Company; John T. Crotty, Republic Supply Company; Stanley P. Brown, Hughes Tool Company; E. W. Gildart, Norvell-Wilder Supply Company; W. J. Morris, Continental Supply Company; W. M. Bovaird, Bovaird Supply Company; Earle Miller, American Iron & Machine Works; John A. Chapman, Lucey Products Company; J. L. Shakely, Frick-Reid Supply Corporation; A. A. Moody, Jarecki Supply Corporation; and D. R. Brown, Oil Country Specialties Company.

DO the sands of certain geologic zones and formations found on the Gulf Coast have enough petrographical or physical characteristics to permit them to be distinguished as "that or this" zone? *This important question will be answered in*

A NEW SERIES OF ARTICLES

By M. T. HALBOUTY

Beginning Next Week

THE writer has completed an extensive study of the component minerals and physical properties of sands from seven producing horizons in the Gulf Coast. In this investigation 315 samples formed the basis of the work. Each sample was subjected to an examination for texture, shapes of grain, mineral composition and permeability. Greatly increasing the importance of the series will be the presentation of a large number of histograms and photomicrographs illustrating the texture, grain shape and sizes of the sands, and other phases studied from each formation.

EXCESSIVE DRILLING

Will be topic discussed at Independents' meet

H. B. Fell, executive vice president of the Independent Petroleum Association of America and chairman of the association's committee on "Balance of Supply With Demand," has announced a subcommittee has been appointed to consider "unnecessary and excessive drilling in proven fields" and to prepare recommendations and suggestions for consideration of the annual membership meeting of the association at the Biltmore Hotel at Oklahoma City November 30 and December 1.

The personnel of this subcommittee is as follows: R. E. Hardwicke, chairman, Hardwicke, Brelsford & Cheek, Fort Worth, Texas; W. P. Z. German, Skelly Oil Company, Tulsa; Don R. Knowlton, Phillips Petroleum Company, Bartlesville, Oklahoma; C. P. McGaha, Fain-McGaha Oil Corporation, Wichita Falls, Texas; Villard Martin, Tulsa; J. R. Pemberton, oil umpire, Los Angeles; A. S. Ritchie, McPherson Drilling Company, Wichita, Kansas; Van S. Welch, Flynn. Welch & Yates, Incorporated, Artesia, New Mexico; and C. E. Yeager, Texas Pacific Coal and Oil Company, Fort Worth.

"Exhibits on the mezzanine at the Biltmore Hotel in Oklahoma City during the annual meeting of Independent Petroleum Association of America on November 30 and December 1," it was stated by C. E. Buchner, executive manager of the association, "will be educational exhibits and there will be no commercial exhibits.

"The Oklahoma City chamber of commerce, through its research committee, is preparing an exhibit consisting of charts and other data showing the value of the petroleum industry to Oklahoma City, to the state of Oklahoma, and to the nation as a whole.

"The American Petroleum Industries committee, through the Oklahoma Petroleum Industries committee, will have a tax exhibit, through which will be graphically portrayed the great tax burden borne by the petroleum industry.

"The Independent Petroleum Association of America, in its exhibit, will graphically show information pertaining to the petroleum industry that will be of interest to all engaged in the industry. Among the more important points brought out through this exhibit will be the effects of a proper balance of supply with demand, as well as the effect of imports on the domestic petroleum industry."

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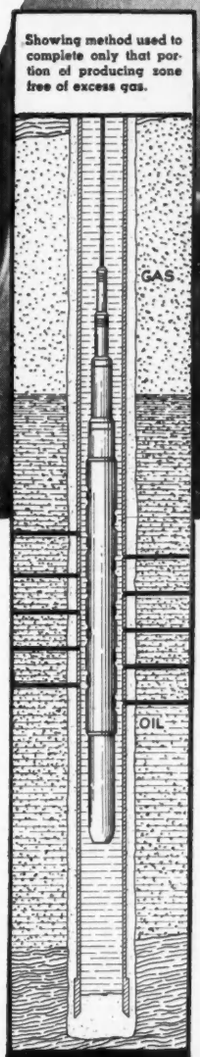

Showing method used to complete only that portion of producing zone free of excess gas.

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"The necessity to complete wells for low Gas/Oil ratio and the trend toward the elimination of water flow has been answered by an improved practice, GUN-Perforating for Low Gas/Oil Ratio. High ratios have been the source of much expense, trouble and inefficiency. In high pressure areas we solve this problem by one of two methods: In cases where it is necessary to shutoff the gas cap formation above the producing zone, the pay zone is drilled and the flow string set and cemented clear thru the producing area shutting off all zones. The casing is then GUN-Perforated at the depth most suitable, tested for correct gas pressure and the well brought in with a Low Gas/Oil Ratio.

"In cases where preliminary tests have shown the main shutoff was too high and excess gas shows below the shutoff and above the oil zone, a stub string is set through the new producing zone. After cementing and pulling the drill and wash pipe assembly the stub string is GUN-Perforated opposite the exact formation level, tested for correct Gas/Oil Ratio and brought in.

Thus GUN-Perforating offers the new method in successful completion that includes only that portion of producing zones that appear free from gas."

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Proceedings A. P. I. Production Division
Annual Meeting, Chicago, November 9-12, 1936

Formation Volumes and Energy Characteristics

OF GAS-CAP MATERIAL FROM KETTLEMAN HILLS FIELD

By B. H. SAGE and W. N. LACEY,
Calif. Institute of Technology,
Pasadena, Calif.

GAS-CAP material from Kettleman Hills Field was obtained in the form of gas and liquid samples from the trap of a well located high on the structure and operating at high gas-oil ratio. The gas sample, the liquid sample, and six different mixtures of them were studied at a series of pressures and temperatures. The results include both formation volumes and specific volumes of the mixtures and thermodynamic properties of the gas sample and of the liquid sample.

It is indicated that a mixture of the samples in the same proportions as would correspond to the operating gas-oil ratio of the well sampled, when brought to equilibrium at conditions of temperature and pressure comparable to those probably existing in the gas-cap sands, would be substantially all in the form of a gas phase.

INVESTIGATIONS of hydrocarbon reserves and of the relative merits of various methods of producing oil and gas require a knowledge of the properties of the materials involved as they exist underground. In fields characterized by the presence of gas caps, the properties of the material occupying that portion of the sands is of interest particularly in those cases where high pressures and temperatures prevail. In these latter cases the material which is gaseous under the conditions in the formation may be expected to separate into gas and liquid phases when brought to surface-trap conditions of temperature and pressure, and probably in the flow string itself.

It was the purpose of the present investigation to study the properties of mixtures resulting from the re-combination in varying proportions of samples of gas and liquid materials obtained from the trap. Only one mixture, that having the same proportion of gas and liquid as was being produced in the trap, would be strictly characteristic of the well production. This mixture, in turn, might not be of exactly the same composition as the material in the gas cap. However, the purpose of the study was more to learn the behavior of such materials than to obtain specific information concerning the one well or field from which the samples originated.

The so-called "white-oil" production from wells high on the structure at Kettleman Hills and operating at high gas-oil ratios appears to be similar in character to that obtained under like conditions in a number of other fields. It would appear, therefore, that the behavior of samples taken from such a well in Kettleman Hills would be of nearly equal general interest in relation to all situations of the same type.

Procurement of Samples

The gas-cap material and corresponding field measurements were obtained through the courtesy of the Kettleman North Dome Association, under the supervision of J. A. Putnam. A gas sample and a liquid sample were obtained from the high-pressure trap of a well located near the middle of the gas-cap area in the Kettleman Hills Field of California. The trap was operating at a pressure of 510 pounds per square inch, absolute, and a temperature of 148° F. at the time the samples were taken. The gas sample was obtained from the gas line leading from this trap at the same time as the liquid sample was withdrawn. At the time of the sampling the well was producing 294 barrels of oil, 165 barrels of water, and approximately 40,000,000 cubic feet of gas per 24 hours. This production corresponds to a gas-oil ratio of approximately 135,000 cubic feet of gas per barrel of oil.

The gas sample was dried at the time of sampling by passing the material through tubes containing anhydrous calcium chloride. Care was taken in the sampling of the liquid to avoid contamination with water. The oil-sample containers were completely filled and so transported to avoid separation of ap-

TABLE 1
Analysis of Gas Sample

Constituent	Composition (Mol. Percent)	Calculated Gasoline Content (Gallons per 1,000 Cu. Ft.)
Air	0.00	.....
Carbon dioxide	0.00	.....
Methane	83.19	.....
Ethane	8.48	.....
Propane	4.37	.....
*Iso*butane	0.76	.....
*n*Butane	1.68	0.528
*Iso*pentane	0.57	0.208
*n*Pentane	0.32	0.116
Residue (as *n*hexane)	0.63	0.258
Total	100.0	1.110
Experimentally-determined specific gravity at 60° F. and 14.73 lb. per sq. in. referred to air.	0.7082	.....

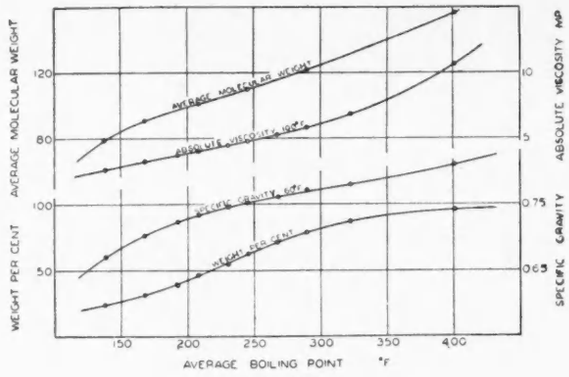

FIGURE 1
Results from Analytical Distillation of the Oil

preciable quantities of gas from the liquid phase. In all subsequent handling of this liquid sample, care was taken to insure that a representative portion of material [1a, 2] was obtained when a sample was removed from the container.

Analysis of Samples

The results of a fractionation analysis of the gas sample are reported in Table 1. Before removing a sample of gas from the original container for this analysis, the container was heated to a temperature of approximately 300° F. to insure uniformity of composition throughout. This procedure was followed whenever a portion of gas was removed from the container. As a check upon the dependability of this procedure, a small sample container was filled after the completion of the experimental work and the greater portion of the gas had been expended. It was found that this material was practically identical in composition with that first removed from the original sample container.

A satisfactory analysis of the liquid sample from the high-pressure trap is considerably more difficult to carry out than the corresponding analysis of the gas. The entire liquid sample taken for analysis was flashed into a large-sized "boiler" of an analytical fractionating column, such as is ordinarily used for analysis of absorber oils, and all of the material lighter than hexane was separated as overhead. This overhead material was then separated into its constituents in natural-gas-fractionation-analysis apparatus. The results of this separation are reported in the first part of Table 2. The pentane-free material, which remained in the large boiler, was then subjected to further distillation in a flask equipped with a Hempel column. The distillate was recovered by means of a condenser through which brine at 30° F. was circulated. The specific gravity, absolute viscosity, average molecular weight, and ASTM Engler distillation data were determined for each of the nine fractions and the residue from the Hempel distillation. These results, along with the distillation recoveries in weight percent and the Hempel still-vapor temperatures, are reported in the second part of Table 2. The changes in some of these properties of the fractions with change in their average boiling points are presented in Figure 1. The pentane-free material, which was subjected to the Hempel distillation, will be referred to hereafter as "oil"; while the entire liquid sample, as obtained from the trap, will be called the "trap-liquid sample."

Experimental Measurements

The experimental methods utilized in the determination of the variation in formation volume[2] and specific volume with pressure, temperature, and gas-

TABLE 2
Analytical Distillation of Kettleman Hills Trap-Liquid Sample

RESULTS FROM LOW-TEMPERATURE DISTILLATION

Methane, 1.93 per cent[1]; ethane, 2.21 per cent; propane, 2.82 per cent; *iso*butane, 1.56 per cent; *n*butane, 4.64 per cent; *iso*pentane, 3.32 per cent; *n*pentane, 3.72 per cent

RESULTS FROM HIGH-TEMPERATURE DISTILLATION

Fraction No.	Still-Vapor Temperature (° F.)	DISTILLATION RECOVERY		Specific Gravity at 60° F.	A.P.I. Gravity at 60° F.	Absolute Viscosity at 100° Fahr. (Millipoises)	Average Molecular Weight	A.S.T.M. ENGLER[2] DISTILLATION (In Deg. F.)					
		Fraction (Weight Percent)	Total (Weight Percent)					Initial Boiling Point	10-Percent Point	50-Percent Point	90-Percent Point	Maximum Temperature	Average Boiling Point
1	152[3]	7.05	27.27[4]	0.6680[5]	80.1	2.64	79	92	112	133	168	204	138.1
2	180	7.40	34.65	0.7019	69.9	3.25	91	116	147	165	196	228	167.8
3	206	7.72	42.37	0.7223	64.2	3.75	....	161	174	187	213	252	192.7
4	218	7.96	50.33	0.7347	60.9	4.12	101	182	193	203	225	261	208.2
5	240	7.97	58.30	0.7466	58.1	4.52	....	206	214	224	251	284	230.5
6	259	8.09	66.39	0.7515	56.6	4.80	110	219	230	240	264	296	245.2
7	280	8.19	74.58	0.7607	54.4	5.24	....	244	253	264	284	314	267.7
8	301	8.31	82.89	0.7720	51.6	5.86	122	269	276	284	310	333	289.6
9	338	8.39	91.28	0.7788	50.0	6.88	....	304	308	318	338	366	322.5
Residue	....	8.73	100.00	0.8110	42.8	10.84	157	356	362	387	450	506	400.9
Oil[6]	....	....	.....	0.7460	58.0	4.70	....	128	185	245	349	441	258.0

[1] Expressed as weight percent. [2] Straight-run-gasoline procedure. [3] All fractions distilled at a pressure of 1 atmosphere. [4] Includes material separated in low-temperature distillation. [5] Referred to water at its maximum density at atmospheric pressure. [6] Pentane-free material, residue from low-temperature distillation subjected to the high-temperature distillation.

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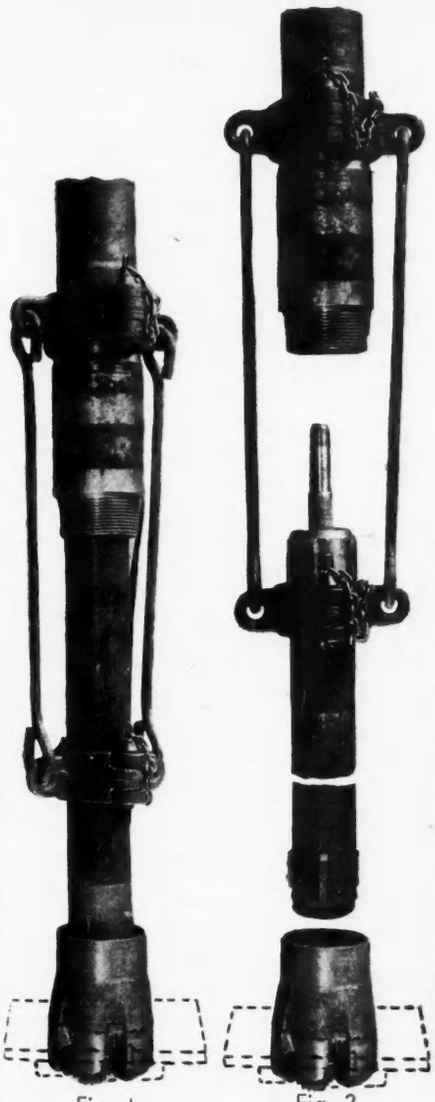

Fig. 1 Fig. 2

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Fig. 3

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Fig. 1—Elevator attached after head has been broken out in the rotary.

Fig. 2—Elevator engaging upper connection on inner barrel as outer barrel is raised.

Fig. 3—Pumping out the core after outer barrel is lowered and inner barrel moved across the floor.

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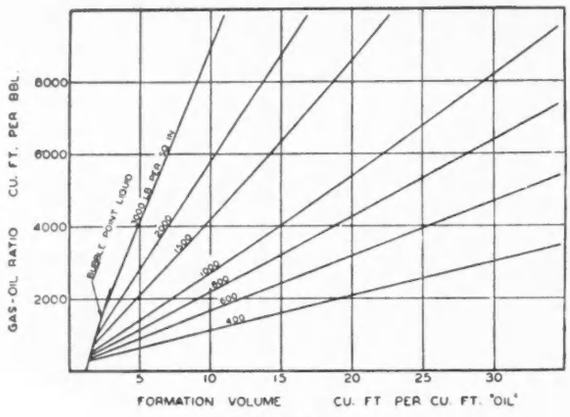

FIGURE 2
Formation Volumes at 160° F.

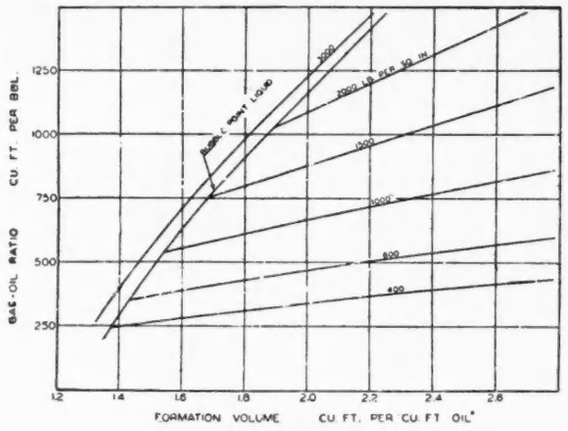

FIGURE 3
Formation Volumes at 160° F. for Low Gas-Oil Ratios

oil ratio have been described elsewhere.[3, 4] The methods of calculation, and of determination of the specific heats which were employed in the evaluation of the thermo-dynamic properties of the materials, have also been described.[4, 5] The work relating to the volumes of the mixtures studied is considered to be dependable within the following limits: pressure, 1 pound per square inch; temperature, 0.1° F.; composition and gas-oil ratio, 0.2 percent; specific volume and formation volume, 0.3 percent.

Formation Volumes

Formation volume[2] may be defined as the number of unit volumes occupied at a designated temperature and pressure by all the hydrocarbon material associated with one unit volume of oil as measured at 60° F. and a pressure of 14.73 pounds per square inch, absolute. For the purposes of this paper the "oil" will be arbitrarily chosen to be the pentane-free portion of the high-pressure trap sample. The gas-oil ratios are expressed in cubic feet of gas (including the pentane and lighter material from the trap-liquid sample) per barrel of oil. On this basis, the composition of the gas is not uniform with changes in gas-oil ratio. This variation in composition is due to the fact that the material classed as gas is derived from two sources. It is composed of a constant amount of the hydrocarbons lighter than pentane in the trap-liquid sample and varying amounts of the gas sample, whose analysis is presented in Table 1. This variation may in some cases approximate more closely actual well behavior than would the choice of gas-oil ratios expressed in terms of a gas of fixed composition. The formation-volume data are recorded in Table 3 as a function of gas-oil ratio and pressure for three temperatures.

In order to aid in the visualization of the effects of pressure, temperature, and gas-oil ratio upon the formation volume of these materials, several illustrative diagrams have been drawn. In Figure 2 is presented the change in formation volume with gas-oil ratio at a series of pressures for 160° F. It is seen that the increase in formation volume with gas-oil ratio is nearly linear throughout the greater portion

TABLE 3
Formation Volumes of Mixtures of Gas and Oil

Temperature (Deg. F.)	Absolute Pressure (Lbs. per Sq. In.)	GAS-OIL RATIOS AS FOLLOWS					
		413.4[1, 2]	674.7	968.2	1,680	6,943	61,514
100.0	....	(600)[3]	(1,128)	(1,674)	(2,500)	.....	.....
	Bubble point	1.395[4]	1.543	1.745	2.253	.....	.....
	400	2.059	4.16	7.03	.....	.....	.....
	500	1.652	3.31	5.53	10.56	46.97	.....
	600	1.345	2.751	4.554	8.654	38.37	348.9
	800	1.390	2.076	3.379	6.374	27.78	252.1
	1,000	1,386	1.705	2.716	5.036	21.52	196.3
	1,250	.....	1.539	2.205	3.988	16.62	151.3
	1,500	1.376	1.533	1.893	3.340	13.45	122.2
	1,750	.....	1.527	1.741	2.910	11.29	102.1
	2,000	1.368	1.521	1.732	2.610	9.732	87.90
	2,250	.....	1.514	1.723	2.403	8.568	77.46
	2,500	1.361	1.509	1.715	2.253	7.704	69.81
	2,750	.....	1.505	1.709	2.233	7.093	64.14
	3,000	1.354	1.500	1.703	2.218	6.697	59.75
160.0	....	(715)	(1,303)	(1,901)	(2,740)	.....	.....
	Bubble point	1.465	1.626	1.846	2.410	.....	.....
	400	2.557	5.107	8.411	.....	.....	.....
	500	2.042	3.986	6.627	.....	.....	.....
	600	1.715	3.326	5.469	10.17	44.84	.....
	800	1.462	2.485	4.054	7.561	32.74	292.9
	1,000	1.456	2.032	3.249	5.992	25.61	229.8
	1,250	.....	1.686	2.623	4.749	19.96	180.0
	1,500	1.443	1.617	2.225	3.973	16.28	147.2
	1,750	.....	1.606	1.968	3.436	13.75	123.9
	2,000	1.431	1.598	1.841	3.041	11.90	107 1
	2,250	.....	1.590	1.829	2.746	10.49	94.70
	2,500	1.420	1.582	1.817	2.540	9.388	85.12
	2,750	.....	1.575	1.806	2.409	8.534	77.62
	3,000	1.410	1.567	1.796	2.385	7.895	71.63
220.0	....	(829)	(1,455)	(1,986)	.....	.....	.....
	Bubble point	1.547	1.726	1.992	.....	.....	.....
	400	3.142	6.278	.....	.....	.....	.....
	500	2.489	4.867	7.740	.....	.....	.....
	600	2.057	3.980	6.494	11.65	51.16	.....
	800	1.587	2.955	4.703	8.722	37.59	329.4
	1,000	1.539	2.377	3.768	6.929	29.53	260.9
	1,250	.....	1.944	3.021	5.494	23.16	205.2
	1,500	1.518	1.723	2.536	4.593	18.99	169.0
	1,750	.....	1.709	2.218	3.952	16.07	143.2
	2,000	1.501	1.695	1.990	3.456	13.95	124.5
	2,250	.....	1.682	1.958	3.083	12.30	110.1
	2,500	1.487	1.670	1.936	2.818	10.99	98.75
	2,750	.....	1.659	1.918	2.623	9.996	89.77
	3,000	1.474	1.651	1.903	2.548	9.251	82.56

[1] Gas-oil ratio expressed as cubic feet of gas including all the pentane and lighter hydrocarbons from the liquid sample per barrel of white oil.
[2] Gas-oil ratio corresponding to liquid sample.
[3] Figures in parentheses refer to bubble-point pressures, in lbs. per sq. in.
[4] Formation volumes expressed as unit volumes occupied at designated temperature and pressure by the material associated with a unit volume of white oil as measured at 60 degrees F. and 14.73 lb. per sq. in., absolute.

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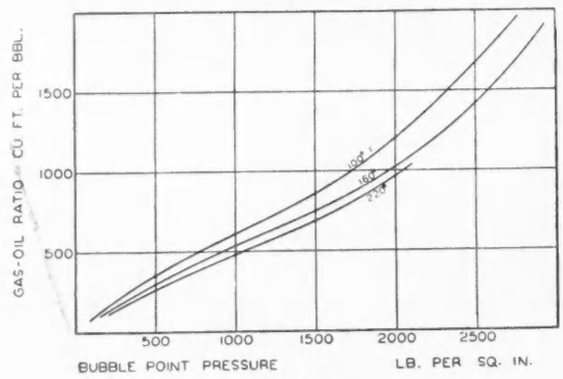


FIGURE 4
Change of Bubble-Point Gas-Oil Ratio with Pressure

of the diagram. Figure 3 is a similar diagram, on an enlarged scale, for the region adjacent to bubble point. Throughout most of the two-phase region, it may be safely assumed for engineering purposes that the change in formation volume at constant pressure is linear with temperature. This fact, however, is not strictly true in the region adjacent to bubble point. In Figure 4 is presented the change in gas-oil ratio with bubble-point pressure for the three temperatures investigated. The increase in the slope of these curves at the higher bubble-point pressures is more rapid with these materials than with systems involving an oil of lower gravity.

The formation volumes reported in Table 3 would only be directly applicable to a reservoir whose material was composed solely of mixtures of the trap-liquid sample and the gas sample produced along with it. In most natural reservoirs this condition would not exist. The gas cap is usually in contact with that portion of the formation containing a heavier liquid phase. For this reason, if equlibrium was maintained continuously, the formation volume of the material produced from the reservoir would be somewhat different from that determined by experiments made upon mixtures of materials produced from the gas cap only. These secondary effects can only be determined directly by exhaustive study of the effect of the addition of such gas-cap materials to a system containing heavier hydrocarbons. The magnitude of this divergence is reduced if equilibrium is not attained throughout the reservoir. It is believed that the results here obtained can be applied in many cases without serious error to natural reservoirs in which the gas cap co-exists with a heavier liquid phase. As the knowledge of reservoir conditions is enlarged by field studies, indications as to the attainment or non-attainment of equilibrium within and between the various parts of the reservoir during the production period will be available. Data of this type concerning reservoir behavior are of great importance in the application of experimental information, such as is recorded here, to formation conditions.

Phase Behavior

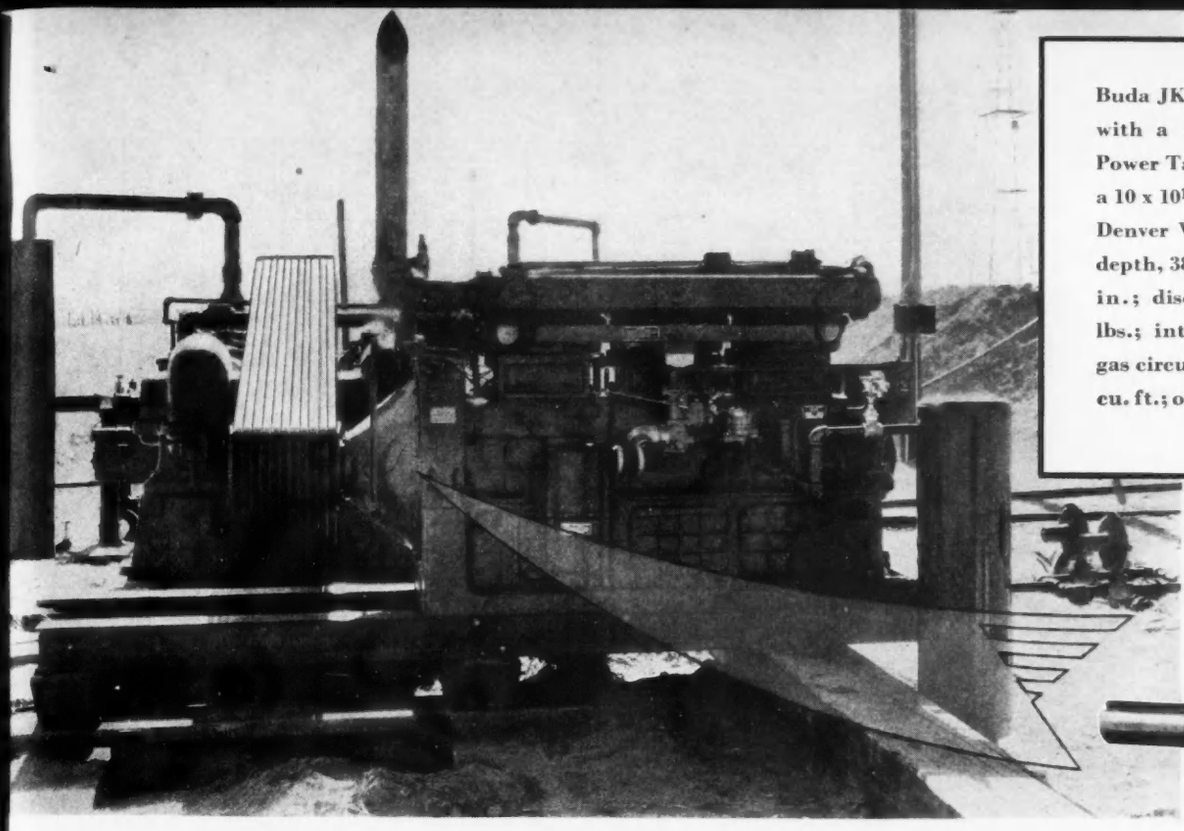
The use of "formation volumes," as such, for the presentation of the phase behavior or the energy relations of hydrocarbon systems is difficult. For these purposes it is more desirable to use specific volume, which is the volume occupied by unit weight of material. In Table 4 are reported values of the specific volume of several mixtures of the trap-liquid sample and the gas sample at a series of pressures for three temperatures.

From the data recorded in this table several diagrams illustrating the phase behavior of these mixtures have been drawn. In Figure 5 is presented a pressure-composition diagram for 160° F. The lines of constant volume (isochores) are included as well as the bubble-point line. The intersection of the bubble-point curve with the left-hand vertical axis corresponds to the bubble-point pressure of the trap-liquid sample at 160° F. The corresponding dew point[6] does not coincide with bubble point in this case, since the trap-liquid sample is not a pure substance. The dew-point pressure of the liquid sample at this temperature is considerably less than one atmosphere. For this reason, it was not considered worthwhile to attempt an investigation of the change in dew point with composition. However, in Figure 5 the dew-point line would lie very slightly above the horizontal axis throughout most of the composition range

TABLE 4
Specific Volumes of Mixtures of Gas and Liquid-Trap Samples

Temperature (Deg. F.)	Absolute Pressure (Lbs. per Sq. In.)	WEIGHT PERCENT GAS AS FOLLOWS				
		5.29	11.34	22.60	60.0	93.4
100.0	.....	(1,128)[1]	(1,674)	(2,500)	.....	.....
	Bubble point	0.02504[2]	0.02651	0.02988	.....	.....
	400	0.0676	0.1068	.....	.....	.....
	500	0.0537	0.0840	0.1401	0.3219	.....
	600	0.04465	0.0692	0.1148	0.2630	0.3964
	800	0.03370	0.05134	0.08455	0.1904	0.2865
	1,000	0.02768	0.04127	0.06680	0.1475	0.2230
	1,250	0.02498	0.03351	0.05290	0.1139	0.1719
	1,500	0.02488	0.02877	0.04431	0.09221	0.1388
	1,750	0.02478	0.02646	0.03860	0.07738	0.1160
	2,000	0.02468	0.02631	0.03462	0.06670	0.09988
	2,250	0.02458	0.02618	0.03188	0.05872	0.08801
	2,500	0.02450	0.02606	0.02988	0.05280	0.07932
	2,750	0.02443	0.02596	0.02962	0.04861	0.07288
	3,000	0.02435	0.02587	0.02942	0.04590	0.06789
160.0	.....	(1,303)	(1,901)	(2,740)	.....	.....
	Bubble point	0.02640	0.02805	0.03198	.....	.....
	400	0.0829	0.1278	.....	.....	.....
	500	0.0647	0.1007	.....	.....	.....
	600	0.05398	0.0831	0.1349	0.3073	.....
	800	0.04033	0.0616	0.1003	0.2244	0.3329
	1,000	0.03299	0.04936	0.07948	0.1755	0.2611
	1,250	0.02736	0.03985	0.06299	0.1368	0.2045
	1,500	0.02624	0.03381	0.05270	0.1116	0.1672
	1,750	0.02607	0.02990	0.04558	0.09425	0.14082
	2,000	0.02593	0.02798	0.04034	0.08159	0.12173
	2,250	0.02580	0.02779	0.03643	0.07190	0.10760
	2,500	0.02567	0.02761	0.03369	0.06434	0.09672
	2,750	0.02556	0.02744	0.03196	0.05849	0.08820
	3,000	0.02544	0.02729	0.03164	0.05411	0.08139
220.0	.....	(1,455)	(1,986)	.....	.....	.....
	Bubble point	0.02802	0.03026	.....	.....	.....
	400	0.1019	.....	.....	.....	.....
	500	0.0790	0.1176	.....	.....	.....
	600	0.0646	0.0968	0.1546	0.3506	.....
	800	0.04796	0.07146	0.1157	0.2576	0.3743
	1,000	0.03858	0.05725	0.09191	0.2024	0.2964
	1,250	0.03156	0.04591	0.07288	0.1587	0.2332
	1,500	0.02797	0.03853	0.06092	0.13017	0.1920
	1,750	0.02774	0.03370	0.05242	0.11013	0.1627
	2,000	0.02751	0.03023	0.04585	0.09560	0.14145
	2,250	0.02730	0.02975	0.04089	0.08428	0.12505
	2,500	0.02710	0.02941	0.03738	0.07535	0.11220
	2,750	0.02693	0.02915	0.0348	0.06851	0.10200
	3,000	0.02679	0.02892	0.0338	0.06340	0.09381

[1] Figures in parentheses refer to bubble-point pressures, in lbs. per sq. in.
[2] Specific volumes expressed in cu. ft. per lb.



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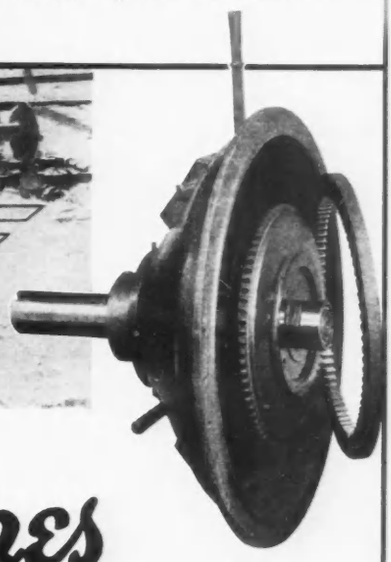

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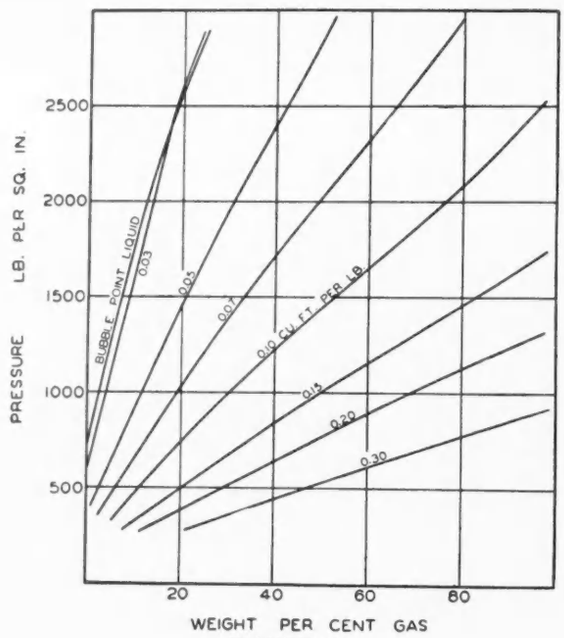


FIGURE 5
Pressure-Composition Diagram for 160° F.

there depicted. The entire area below and to the right of the bubble-point curve is in the two-phase region. The isochores are nearly straight throughout this region.

In the region of composition corresponding to nearly pure gas, the determination of the location of phase boundaries in such complex systems requires very precise and detailed knowledge of the pressure-volume-temperature relations. The data indicate that two phases persist up to compositions containing gas in excess of 93 weight percent of the total mixture. This composition corresponds to a gas-oil ratio of approximately 60,000 cubic feet per barrel. The production gas-oil ratio at the time of sampling was about 135,000 cubic feet per barrel. It, therefore, appears that this material is being produced primarily from a gaseous phase within the formation. Under the conditions of the laboratory experiments, there might be an unmeasurable trace of liquid phase present even at a gas-oil ratio as high as 135,000 cubic feet per barrel. This trace of liquid material would, however, be taken up by the gas phase if the latter were to be brought to equilibrium with a body of liquid oil such as would be found in the formation.

It is of interest to compare the behavior of these mixtures of high gas-oil ratio with that of a perfect gas. In Figure 6 is plotted, for 160° F., the pressure-volume product of each of these materials as a function of the pressure. The behavior of a perfect gas would be shown in this diagram by a horizontal straight line. The appreciable effect of small amounts of heavier hydrocarbons upon the pressure-volume behavior of these materials is evident.

Thermodynamic Properties

Because of the dearth of such information for natural gases, a detailed investigation of the thermodynamic behavior of the trap-gas sample was made. In Figure 7 is shown the ratio of the pressure-volume product at a given pressure and temperature to the

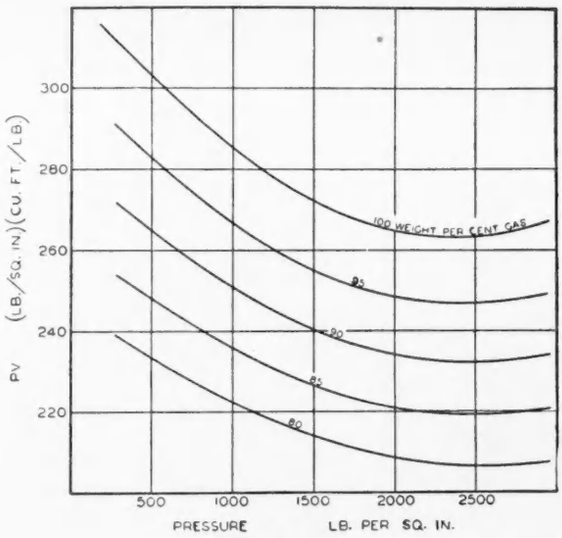


FIGURE 6
Compressibility of High-Gas-Oil-Ratio Mixtures at 160° F.

pressure-volume product at the same temperature for a pressure of one atmosphere. From these data and information as to the variation of specific heat with temperature, the variation of the specific values of heat content and entropy with pressure and temperature have been calculated.[4] The isobaric specific heats at atmospheric pressure were determined by the adiabatic expansion method.[5] It was found that the experimentally-determined isobaric specific heats agreed within the experimental uncertainty with those calculated on the basis of ideal solutions from such information for the individual constituents. These calculated thermodynamic properties are reported in the first part of Table 5. In order to check the accuracy of these values, a few experimental measurements of the Joule-Thomson coefficient were made and it was found that these values agreed sub-

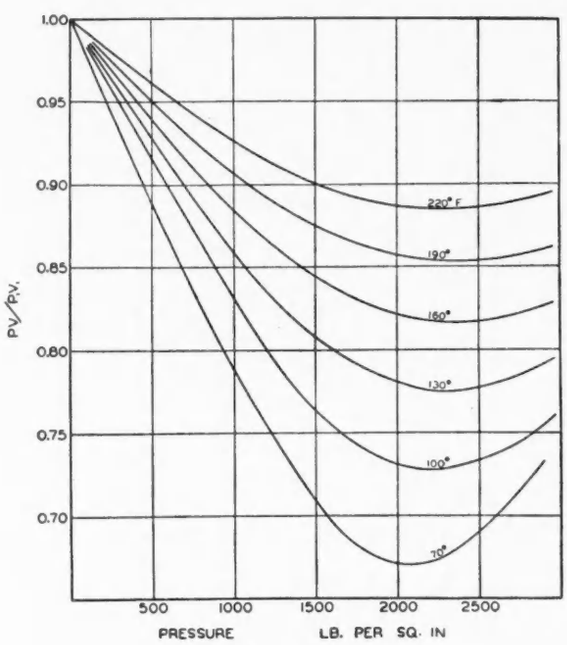
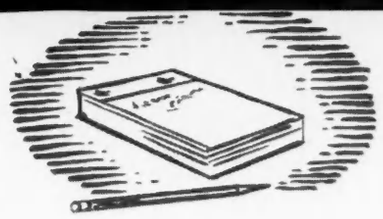


FIGURE 7
Compressibility of the Natural Gas



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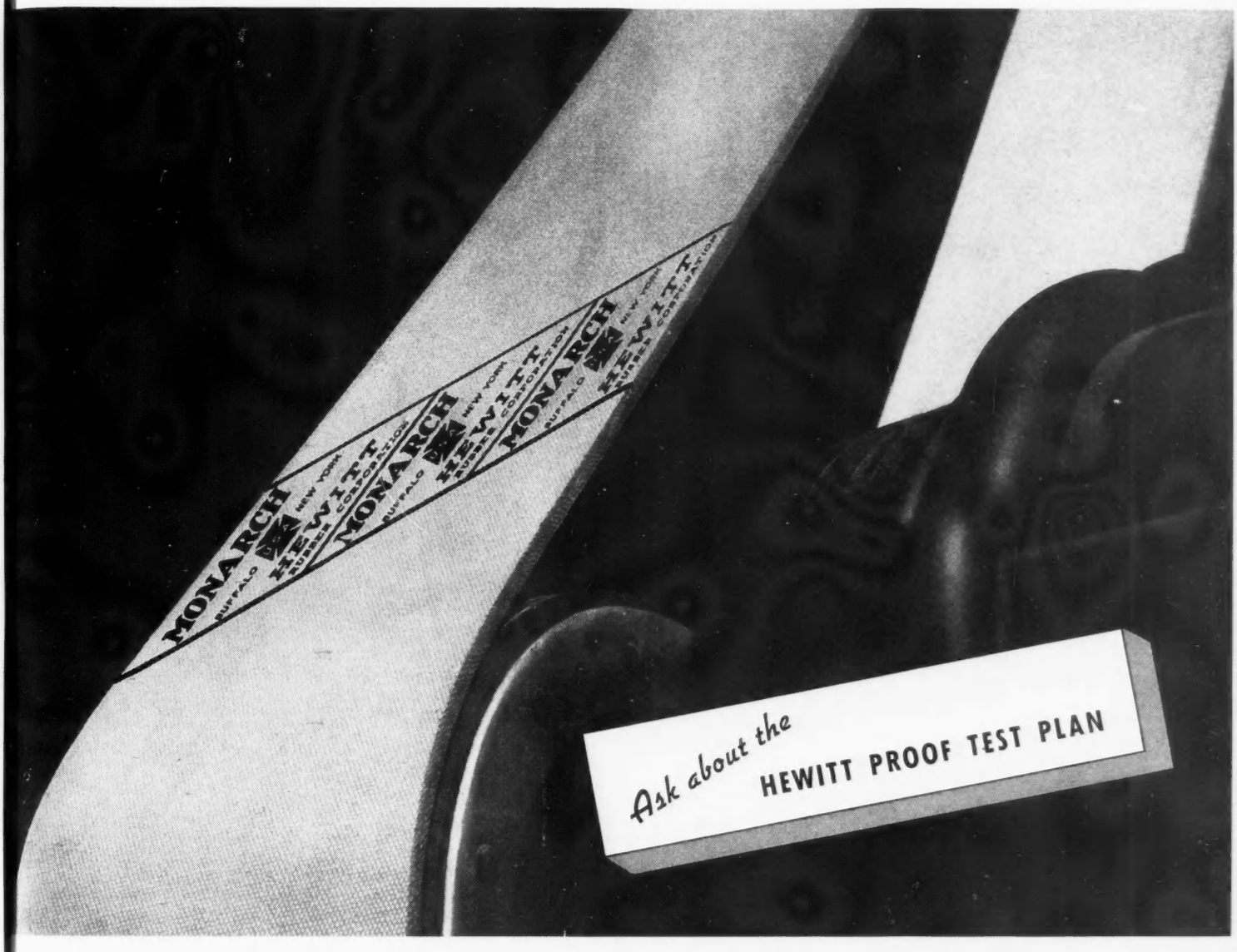

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stantially with those calculated from the properties recorded in Table 5.

The thermodynamic properties of hydrocarbon mixtures similar to the trap-liquid sample are also sufficiently little known to make an evaluation of these properties worthwhile. In Table 6 are recorded specific values of volume, heat content, and entropy. These data were based upon experimentally-determined pressure-volume-temperature relations and the isochoric specific heat values depicted in Figure 8. These specific heats were determined in an adiabatic calorimeter,[5] and are considered dependable within one percent. Since the pressure-volume-temperature measurements were to be used in the calculation of heat content and entropy, the experimental measurements were carried out with greater precision for this particular material. It is believed that the experimental uncertainty is within the following limits: pressure, 0.5 pounds per square inch; temperature, 0.02° F.; specific volume, 0.1 percent. In Table 6 the values of heat content and entropy were carried to at least one more significant figure than was warranted by the accuracy of the specific heat measurements. This was done in order to show the isothermal changes in these properties with satisfactory accuracy. The graphical presentation of these thermodynamic data gives charts similar in appearance to those presented elsewhere.[7, 8, 9] For this reason, no graphical representation of these data has been made here.

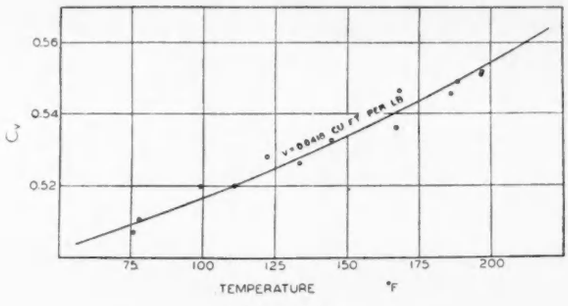

FIGURE 8
Specific Heat at Constant Volume of Trap-Liquid Sample

Acknowledgments

The samples were obtained through the courtesy of Kettleman North Dome Association and Standard Oil Company of California, under the supervision of J. A. Putnam. The analyses of the samples recorded in Tables 1 and 2 were made in the laboratories of Union Oil Company of California. The authors wish to express their appreciation to these organizations, whose helpful cooperation has been of great assistance in this work. The assistance of J. E. Sherborne and D. C. Webster, in connection with the experimental work, is acknowledged. The financial support and cooperation of the American Petroleum Institute have made this investigation possible as a part of the work of its Research Project 37.

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[6] *A.P.I. Prod. Bull. No. 212,* 119 (1933).
[7] *Ind. Eng. Chem.,* **28,** 489 (1936).
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[9] *Ind. Eng. Chem.,* **28,** 249 (1936).

TABLE 5
Thermodynamic Properties of Trap-Gas Sample

Absolute Pressure (Lbs. per Sq. In.)	70° F.			100° F.			130° F.			160° F.			190° F.			220° F.		
	V[1]	H	S	V	H	S	V	H	S	V	H	S	V	H	S	V	H	S
300	0.8572	91.7	0.3522	0.9180	107.8	0.3819	0.9774	124.0	0.4101	1.0359	140.0	0.4365	1.0940	156.1	0.4620	1.1516	172.7	0.4869
400	0.6276	87.3	0.3184	0.6756	104.1	0.3490	0.7218	120.6	0.3780	0.7674	136.8	0.4049	0.8133	153.1	0.4306	0.8572	169.9	0.4557
500	0.4903	83.1	0.2909	0.5300	100.3	0.3225	0.5685	117.3	0.3522	0.6063	133.8	0.3795	0.6435	150.2	0.4055	0.6803	167.1	0.4308
600	0.3985	78.8	0.2674	0.4333	96.6	0.3000	0.4665	113.9	0.3304	0.4992	130.7	0.3581	0.5311	147.2	0.3844	0.5627	164.3	0.4099
800	0.2848	70.5	0.2282	0.3127	89.3	0.2627	0.3395	107.4	0.2943	0.3653	124.6	0.3228	0.3907	141.5	0.3498	0.4157	158.9	0.3755
1,000	0.2175	62.5	0.1958	0.2412	82.2	0.2319	0.2637	100.9	0.2646	0.2856	118.6	0.2940	0.3072	135.8	0.3214	0.3282	153.6	0.3476
1,250	0.1647	52.9	0.1612	0.1846	73.6	0.1992	0.2039	93.2	0.2333	0.2226	111.3	0.2636	0.2408	129.0	0.2914	0.2583	147.1	0.3183
1,500	0.1304	44.0	0.1315	0.1481	65.5	0.1711	0.1652	85.8	0.2063	0.1815	104.4	0.2375	0.1972	122.4	0.2659	0.2124	141.0	0.2932
1,750	0.1073	35.8	0.1054	0.1237	58.0	0.1463	0.1388	78.8	0.1825	0.1532	97.8	0.2145	0.1671	116.3	0.2434	0.1802	135.1	0.2713
2,000	0.0925	28.4	0.0823	0.1064	51.1	0.1242	0.1198	72.3	0.1613	0.1326	91.7	0.1939	0.1449	110.5	0.2234	0.1569	129.6	0.2516
2,250	0.0828	21.9	0.0619	0.0941	44.9	0.1045	0.1055	66.4	0.1423	0.1169	86.2	0.1753	0.1283	105.1	0.2050	0.1394	124.4	0.2339
2,500	0.0753	16.2	0.0440	0.0853	39.5	0.0871	0.0953	61.2	0.1252	0.1053	81.1	0.1586	0.1154	100.2	0.1889	0.1254	119.7	0.2179
2,750	0.0697	11.5	0.0284	0.0786	34.9	0.0717	0.0875	56.7	0.1101	0.0964	76.7	0.1436	0.1054	95.9	0.1741	0.1143	115.5	0.2034
3,000	0.0657	7.7	0.0151	0.0736	31.1	0.0584	0.0815	52.9	0.0969	0.0892	73.0	0.1305	0.0973	92.2	0.1611	0.1051	111.8	0.1904

[1] V—specific volume, cu. ft. per lb.; H—heat content, Btu. per lb.; S—entropy, Btu. per lb. per degree F., absolute.

TABLE 6
Thermodynamic Properties of Trap-Liquid Sample

Absolute Pressure (Lbs. per Sq. In.)	70° F. (543)[1]			100° F. (600)			130° F. (658)			160° F. (715)			190° F. (772)			220° F. (829)		
	V[2]	H	S	V	H	S	V	H	S	V	H	S	V	H	S	V	H	S
Bubble pt.	0.02345	—1.90	0.01636	0.02391	13.60	0.04430	0.02448	29.42	0.07136	0.02511	45.59	0.09766	0.02579	62.19	0.12339	0.02651	79.35	0.14882
175	0.07535	1.08	0.02700	0.0858	17.41	0.05696	0.0974	34.28	0.08633	0.111	51.84	0.11536	.....	70.13	0.1442	.....	.....	0.1735
200	0.06530	0.66	0.02561	0.07395	16.90	0.05539	0.08371	33.62	0.08448	0.0952	50.95	0.11309	0.1093	68.78	0.14133	0.127	87.62	0.1700
300	0.04200	—0.51	0.02152	0.04732	15.47	0.05088	0.05325	31.88	0.07945	0.05997	48.74	0.10731	0.06748	66.07	0.13465	0.07535	84.16	0.16196
400	0.03148	—0.71	0.01889	0.03529	14.63	0.04800	0.03940	30.87	0.07629	0.04383	47.51	0.10381	0.04864	64.60	0.13077	0.05384	82.39	0.15754
500	0.02541	—1.72	0.01707	0.02831	14.04	0.04590	0.03152	30.17	0.07401	0.03500	46.67	0.10130	0.03862	63.63	0.12802	0.04265	81.21	0.15447
600	0.02342	—1.75	0.01619	0.02391	13.60	0.04426	0.02670	29.65	0.07222	0.02940	46.07	0.09937	0.03222	62.95	0.12596	0.03526	80.40	0.15225
800	0.02334	.....	0.01559	0.02383	.....	0.04358	0.02441	29.75	0.07636	0.02506	45.77	0.09731	0.02577	62.24	0.12326	0.02720	79.44	0.14917
1,000	0.02326	—0.64	0.01501	0.02376	14.61	0.04291	0.02432	30.21	0.07560	0.02496	46.20	0.09650	0.02565	62.63	0.12240	0.02637	79.65	0.14803
1,500	0.02309	0.74	0.01358	0.02359	15.90	0.04112	0.02413	31.41	0.07382	0.02473	47.30	0.09444	0.02535	63.64	0.12034	0.02601	81.09	0.14585
2,000	0.02297	2.13	0.01218	0.02344	17.21	0.03957	0.02396	32.63	0.07213	0.02453	48.45	0.09232	0.02511	64.73	0.11840	0.02572	80.25	0.14383
2,500	0.02286	3.52	0.01082	0.02332	18.54	0.03809	0.02380	33.89	0.07053	0.02434	49.65	0.09088	0.02490	65.86	0.11659	0.02548	83.18	0.14193
3,000	0.02276	4.93	0.00948	0.02320	19.89	0.03665	0.02366	35.19	0.06901	0.02416	50.89	0.08926	0.02470	67.05	0.11489	0.02526	84.32	0.14014

[1] Figures in parentheses refer to bubble-point pressures, in lbs. per sq. in., absolute.
[2] V—specific volume, cu. ft. per lb.; H—heat content, Btu. per lb.; S—entropy, Btu. per lb. per degree F., absolute.

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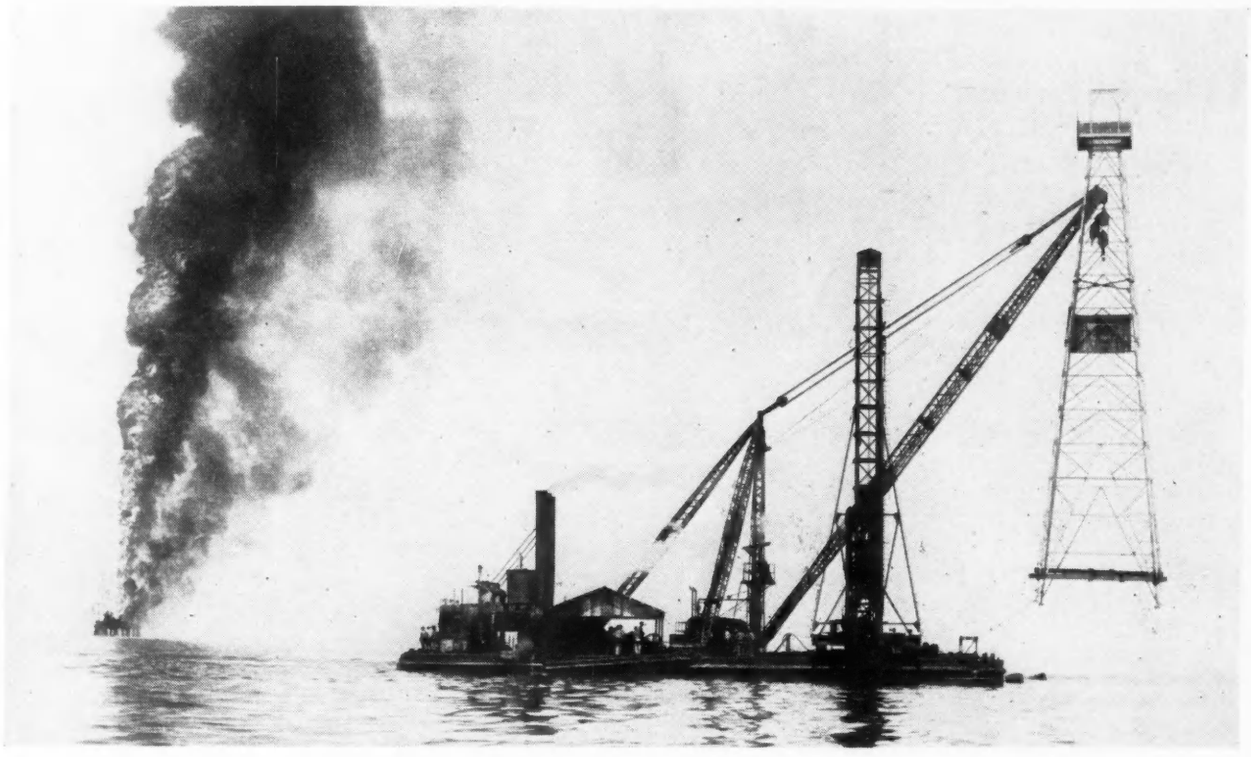

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INVESTIGATION OF *Angle Columns* AS USED FOR DERRICK LEGS

By S. B. SETTLE,
Parkersburg Rig & Reel Company,
Parkersburg, West Virginia

THIS paper reviews the present practice for determining the capacities of A.P.I. derricks; records the results of tests conducted in the laboratory on full-size angle-leg sections; shows that there is a discrepancy in the existing A.P.I. column formulas; and points to the need of further investigation for the purpose of evolving a more correct method of rating derricks so that the derrick's safe load capacities will be commensurate with the strength of the leg sections.

THE standardization of rigs and derricks has proved to be one of the most outstanding accomplishments of the American Petroleum Institute. It has been beneficial to the equipment manufacturer as well as to the oil producer.

It is probable that the standardization of working stresses, by the American Petroleum Institute, for design purposes has done more to insure correctly-designed derricks than any other factor. This adoption of judicious formulas not only safeguards the ultimate user of steel derricks, but protects reputable manufacturers against unscrupulous or incompetent engineering design.

Discussion of Column Formulas

In reviewing the method of arriving at the safe load capacity of a derrick, we quote from A.P.I. specifications for standard rigs and derrick,† as follows ". . . . The A.P.I. safe load capacity of an A.P.I. derrick . . . . shall be determined by computing the sum of the strengths of the four leg members *at their weakest section.*" These leg members must be designed in accordance with the A.P.I. column formulas.‡ The maximum unsupported length "L" of the leg (column) is designated as 7 ft.‡

The A.P.I. column formula, for regular structural steel, is the same as the American Institute of Steel Construction column formula (prior to the 1936 revision). This is a Rankine-Gordon type of formula, and during the past few years it has been generally accepted for structural-steel design—with the exception of the 1935 specifications of the American Railway Engineering Association and the practice of a prominent fabricating company, who favor a parabolic type of formula such as the following:

$$\frac{P}{A} = 15{,}000 - 0.25\,\frac{L^2}{R^2}$$

NOTE—In all formulas in this paper the following nomenclature applies.

P=total compression load, in pounds.
A=gross cross-sectional area of the columns, in square inches.
L=length of the column, in inches.
R=the least radius of gyration of the column cross-section, in inches.

† Par. 4-d-1, p. 9, A.P.I. Standards No. 4, eighth revision.
‡ Par. 4-d-2 and 4-d-3, p. 10 and 11, A.P.I. Standards No. 4, eighth revision.
§ "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings."

The progress in manufacturing processes during the last decade has brought about the production of steels of much higher quality than that produced in former years. As a result, the American Institute of Steel Construction has recently published, in pamphlet form,§ a 1936 revision to their specifications. This revision is a supplement to the latest issue of the *A.I.S.C. Handbook: "Steel Construction."* The new specifications call for a basic unit tensile stress (on net section) of 20,000 pounds per square inch. The new unit stress for compression is derived from the formulas:

a. Gross section, for columns with values of $\frac{L}{R}$ not greater than 120:

$$\frac{P}{A} = 17{,}000 - 0.485\,\frac{L^2}{R^2}$$

b. Gross section, for columns with values of $\frac{L}{R}$ greater than 120:

$$\frac{P}{A} = \frac{18{,}000}{1 + \frac{L^2}{18{,}000\,R^2}}$$

Note that the second formula is the same as the *old* column formula.

The Institute's derrick committee has been awaiting the new A.I.S.C. specifications for structural steel and, when available, will consider their application to derrick structures.

Table 6 of this paper lists various formulas (in-

cluding the new A.I.S.C. formula) now governing the design of structural-steel columns. Figure 5 shows graphically the relationship of the various curves derived from the formulas.

The A.P.I. column formula for structural *silicon* steel is also of the Rankine-Gordon type. This formula is used only by the American Petroleum Institute, and is subject to revision depending upon the results of experimental work.

Other users of silicon steel prefer one of the formulas listed in Table 7 of this paper. Curves derived from the various formulas are plotted in Figure 6.

Because of the lack of data by which to prove the correctness of the present A.P.I. column formula for silicon steel, it has long been considered very desirable to have some experimental tests conducted, using angle columns of this material.

Reduction of Gross Cross-sectional Area

The column formulas herein discussed, for both regular structural steel and structural silicon steel, are based upon the *gross cross-sectional area* of the column. This practice is sound for the design of permanent structures, where all of the area deducted by punching or drilling holes is eventually replaced by power-driven rivets or by turned bolts. Derricks are not permanent structures; in fact, one of the necessary requirements of these structures is that they be of "knock-down" or bolted construction. The bolts are 1/16 inch smaller in diameter than the holes in the members. It follows that the bolts will not assist in resisting compression in the angle column until the metal around the bolts is actually compressed so as to cause bearing on the upper and lower area of the bolt. If the thread of the bolt extends into the angle column, this condition is intensified.

There can be no doubt that the reduction of the

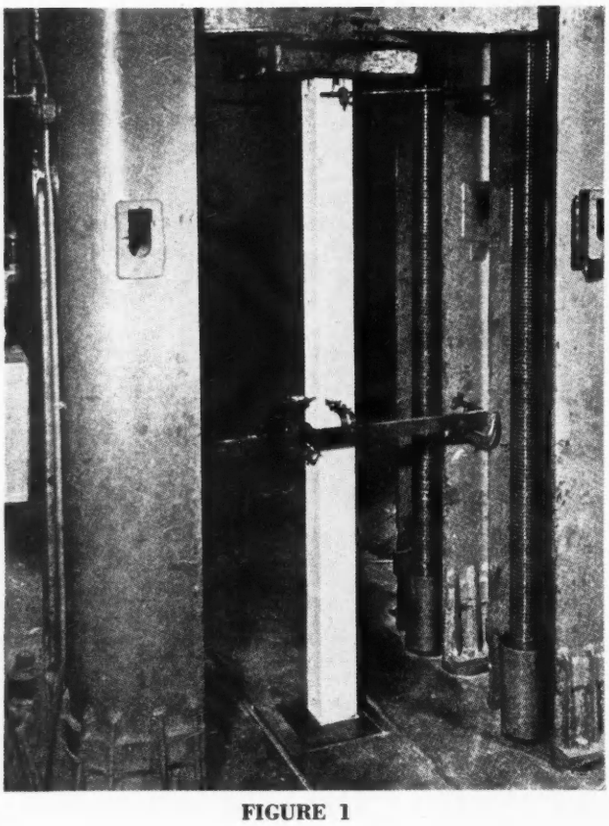

FIGURE 1

TABLE 1

EXAMPLE	Size of Angle (Inches)	Ratio of Leg Width to Thickness of Metal
1	8×8×½	16 to 1
2	6×6×⅜	16 to 1
3	5×5×⅜	13.3 to 1
4	5×5×¼	16 to 1
5	5×5×¼	20 to 1
6	4×4×¼	16 to 1

cross-sectional area will have considerable tendency to lower the elastic limit of an angle column. This will probably be most noticeable in those columns made from large-size angles which fail by direct compression (or crippling action near the ends). For those columns which are "on the border line" (i.e., those which fail sometimes by crippling near the ends and at other times by flexure or buckling near the center, or by a combination of both) the reduction of area would naturally influence the angle to fail more often by crippling action near the ends; the 5-inch×5-inch×⅜-inch. "L" would be an example of this condition. Slender columns, such as the 4-inch×4-inch×¼-inch "L", which usually fail near the center by flexure or buckling, or a combination of both, would be the least affected by the reduction of the cross-sectional area.

It has been apparent for years not only to designing engineers, but also to oil companies' engineers, that there is a discrepancy in the present A.P.I. column formulas when used under the conditions outlined in the two preceding paragraphs; however, up to date no data have been available to warrant making corrections. Derricks contiue to be rated on the basis of 7-foot unsupported column lengths and the *gross cross-sectional area* of the column. This is true regardless of the fact that the angle cross-section is greatly reduced by two holes in line (one in each leg of the angle) which may or may not be partly filled by bolts, and also regardless of the A.P.I. specification which states that the safe load capacity of the derrick shall be based upon the strength of the 4 leg members *at their weakest section.* It seems to have been generally accepted that the large safety factor embodied in the column formulas would adequately compensate for the reduction of the gross cross-sectional area by punching or drilling holes in the legs. Little thought seems to have been given to the fact that an oil derrick is in a class entirely by itself when compared with other structures, inasmuch as it must meet the following specifications:

a. It must be light and portable.
b. It must be capable of being easily and quickly erected or dismantled by rig builders, most of whom are experienced but some of whom are not.
c. It must be capable of resisting twisting strains, reversals of stress, high winds and shock loads, in addition to the regular pulling loads for which it is designed.
d. Last, while it must be of bolted construction to insure speedy and easy erection or dismantling, it must withstand more abuse than ordinarily expected of permanent structures.

Use of Thin Angle Sections

The use of extremely thin material for angle column sections should be given careful study. Table 1 has been prepared to show the relationship between the leg width and metal thickness of the thinner

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UNITED STATES STEEL

angles that are commonly used in derrick construction. The angles in boldface type are the minimum weights of those particular sizes that are shown in the structural-steel handbooks, and are considered standard by the mills. It will be noted that the greatest ratio of leg width to metal thickness of these standard angles is 16 to 1. Angles 5-inch × 5-inch × 5/16-inch and 5-inch × 5-inch × ¼-inch are obtainable from the mills, through special arrangement, and have been used for derrick legs. As the radius of gyration of a particular size of angle remains practically constant throughout the range of metal thicknesses, it is obvious that the purpose in using the special thin sections is to obtain the maximum working load capacity for the given cross-sectional area. Certainly, there is some limit to the thickness that may be used and still have the usual column formula apply.

When a concentric load is applied to an angle column, each unit of cross-sectional area is subjected to a proportional part of the entire load; therefore, each unit of area at the extremities of the angle legs may theoretically be expected to carry as much load as those units of area at or near the apex of the angle. However, we know that in actual practice each leg of the angle acts as a rectangular plate which is restrained only along one side. The wider and thinner the leg, the less is the restraint; and, consequently, the leg will have a much greater tendency to buckle along its outer (unrestrained) edge than would a long, thin plate used as a column. It is generally agreed that it is not practical to form sheet metal and use the same as an angle column; yet a 5-inch×5-inch×5/16-inch angle section, thus formed, would have a smaller $\frac{L}{R}$ value than a 5-inch×5-inch×⅜-inch angle; and, therefore, would be entitled to a greater unit working stress *if* the usual column formula were applied. The importance of restraint between adjacent legs of an angle may readily be determined by testing two angles in compression: one of which would be a standard 5-inch×5-inch×⅜-inch rolled angle section, and the other a 5-inch×5-inch×⅜-inch angle formed of laminated sheets. Undoubtedly the laminated angle would have considerably less strength as a column than the standard rolled angle.

Laboratory Test

In recognition of the thoughts presented in the foregoing discussion, a derrick manufacturer recently engaged the services of a commercial testing laboratory to conduct a series of tests on 7-foot angle columns, for a three-fold purpose: 1, to obtain substantive data on structural silicon-steel angle columns, to be used as a basis for study of the present "tentative" A.P.I. column formula for silicon-steel columns; 2, to determine to what extent the reduction of cross-sectional area of angle columns, by punching holes, affects the strength of the column and the type of failure; 3, to compare the column action of a special, thin section angle with

TABLE 2

Carnegie-Illinois Steel Corporation Report

Heat No.	CHEMICAL ANALYSIS					Test Specimen Mark	PHYSICAL TESTS						
	Carbon	Manganese	Phosphorus	Sulfur	Silicon		Test Piece Cut From: (Inches)	Area of Test Piece (Sq. In.)	Yield Point (Lb. per Sq. In.)	Tensile Strength (Lb. per Sq. In.)	Elongation in 8 In. (Percent)	Reduction of Area (Percent)	Bend Test
59,349	0.32	0.72	0.020	0.030	0.288	S-88-1 S-88-2 S-88-3 (KINK)	8×8×½ "L"	Not given	41,760	80,780	25.0	49.3	O.K.
*						S-88-4	8×8×½ "L"		51,230	94,710	20.7	48.7	
57,222	0.22	0.68	0.022	0.037		M-88-1 M-88-2 M-88-3 (KINK)	8×8×½ "L"	Not given	37,760	67,700	27.5		O.K.
* 305						M-88-4	8×8×½ "L"		32,480	57,510	31.2	62.6	
311,047	0.34	0.76	0.017	0.026	0.30	S-66-1 S-66-2 S-66-3	6×6×⅜ "L"	0.6352	53,500	86,700	20.0	45.2	O.K.
305,228	0.19	0.50	0.018	0.035		M-66-1 M-66-2 M-66-3	6×6×⅜ "L"	0.6250	37,600	63,500	27.5	52.0	O.K.
309,077	0.35	0.83	0.018	0.028	0.33	S-55-1 S-55-2 S-55-3	5×5×⅜ "L"	0.6179	51,700	86,500	20.0	53.5	O.K.
*312,015						M-55-1 M-55-2 M-55-3	5×5×⅜ "L"		40,186	63,716	29.8	59.7	
307,254	0.19	0.47	0.017	0.031		M-55-4	5×5×⅜ "L"	0.6371	37,600	60,400	30.0	54.9	O.K.
309,077	0.35	0.83	0.018	0.028	0.33	S-55-S1 S-55-S2 S-55-S3	5×5×¼ "L"	0.7238	55,200	88,900	21.2	45.1	O.K.
314,013	0.35	0.92	0.038	0.036	0.27	S-44-1 S-44-2 S-44-3	4×4×¼ "L"	0.4575	51,300	93,300	20.0	47.1	O.K.
316,014	0.22	0.53	0.020	0.027		M-44-1 M-44-2 M-44-3	4×4×¼ "L"	0.4182	37,300	62,900	28.7	55.2	O.K.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)

* Taken from stock—mill report not available. Physical tests performed by Pittsburgh Testing Laboratory, on coupons cut from the angles **after** the compression tests had been completed.

that of an angle of the same leg width but in the minimum thickness ordinarily furnished by rolling mills.

Table 2 was compiled from rolling-mill reports covering the steel specimens used for these tests.

The angles received from the mill were in multiple lengths. These lengths were sheared to 7 feet ¼ inch and given "test-specimen marks." Each specimen was then checked for mill tolerances, area, etc. The results of this check may be found in Table 3.

All test specimens were milled to 7 feet ¼ inch, and holes punched the same as in ordinary derrick-leg manufacturing.

The author was delegated to supervise and observe the testing of the derrick-leg angles. A general report of the actual tests follows.

To approximate field conditions, a ¾-inch diameter bolt was inserted in every hole of each specimen and tightened. All test specimens were coated with a whitewash preparation consisting of 2½ pounds of slaked lime mixed with 1 gallon of water. This was applied with a brush—one coat only—and allowed to dry thoroughly.

The base of the testing machine was properly marked to insure each specimen being placed in position so that its neutral axis would coincide with the center line of the testing-machine base and head.

With the column placed in position on the base of the testing machine, the compression head was lowered until a small load was applied to the column to hold it in place. Two Ames gages (which could be read accurately to the nearest one-thousandth of an inch) were then applied at the column center to record the deflection of the column about its neutral axes; a third gage was applied at the compression head of the machine to record the change in length of the column as the compression load was applied. With a small initial load applied, the machine was balanced and all gages set at zero. Figure 1 illustrates a typical column in the test machine ready for the compression test. The column was then loaded in increments ranging from 5,000 pounds to 20,000 pounds, depending upon the size and safe load rating of the angle, until the approximate safe working load capacity of the column was reached, after which the load increments were reduced. The readings on the three dials were recorded for each load increment until the column showed definite failure. This procedure was followed in testing each of the 30 specimens.

Table 4 was prepared as a ready reference to the data compiled from the laboratory tests.

The special whitewash coating proved very effec-

TABLE 3

Inspection Prior to Fabrication

Test-Specimen Mark	DESCRIPTION (Inches)	Actual Total Weight (Pounds)	Average Area Based on Weight (Sq. In.)	Nominal Area (Sq. In.)	MILL TOLERANCE CHECK				
					Leg Length	Out of Square	Straight for Length	Thickness	Remarks
S-88-1‡	8×8×½ "L"×7′ ¼″ (Sil.)	185.95	7.78	7.75	O.K.	O.K.	O.K.	Over-run	Allowable over-run=0.0125″
S-88-2‡	8×8×½ "L"×7′ ¼″ (Sil.)	185.95	7.78	7.75	O.K.	O.K.	O.K.	0.006″ to 0.009″ one leg.	
S-88-3†‡ (KINK)	8×8×½ "L"×7′ ¼″ (Sil.)	185.70	7.77	7.75	O.K.	O.K.	1/16″ kink in 2½″ length	0.016″ to 0.022″ other leg.	
S-88-4*	8×8×½ "L"×7′ ¼″ (Sil.)	183.20	7.67	7.75	O.K.	O.K.	O.K.	O.K.	O.K.
M-88-1	8×8×½ "L"×7′ ¼″ (Car.)	184.95	7.74	7.75	O.K.	O.K.	O.K.	O.K.	O.K.
M-88-2	8×8×½ "L"×7′ ¼″ (Car.)	184.95	7.78	7.75	O.K.	O.K.	O.K.	O.K.	O.K.
M-88-3† (KINK)	8×8×½ "L"×7′ ¼″ (Car.)	185.20	7.75	7.75	O.K.	O.K.	1/16″ kink in 3″ length	O.K.	O.K.
M-88-4*	8×8×½ "L"×7′ ¼″ (Car.)	185.45	7.76	7.75	O.K.	O.K.	O.K.	O.K.	O.K.
S-66-1	6×6×⅜ "L"×7′ ¼″ (Sil.)	102.95	4.31	4.36	O.K.	O.K.	O.K.	O.K.	O.K.
S-66-2	6×6×⅜ "L"×7′ ¼″ (Sil.)	102.95	4.31	4.36	O.K.	O.K.	O.K.	O.K.	O.K.
S-66-3	6×6×⅜ "L"×7′ ¼″ (Sil.)	102.45	4.29	4.36	O.K.	O.K.	O.K.	O.K.	O.K.
M-66-1	6×6×⅜ "L"×7′ ¼″ (Car.)	104.70	4.38	4.36	O.K.	O.K.	O.K.	O.K.	O.K.
M-66-2	6×6×⅜ "L"×7′ ¼″ (Car.)	104.70	4.38	4.36	O.K.	O.K.	O.K.	O.K.	O.K.
M-66-3	6×6×⅜ "L"×7′ ¼″ (Car.)	104.20	4.36	4.36	O.K.	O.K.	O.K.	O.K.	O.K.
S-55-1	5×5×⅜ "L"×7′ ¼″ (Sil.)	85.90	3.59	3.61	O.K.	O.K.	O.K.	O.K.	O.K.
S-55-2	5×5×⅜ "L"×7′ ¼″ (Sil.)	85.40	3.57	3.61	O.K.	O.K.	O.K.	O.K.	O.K.
S-55-3	5×5×⅜ "L"×7′ ¼″ (Sil.)	85.65	3.58	3.61	O.K.	O.K.	O.K.	O.K.	O.K.
M-55-1*	5×5×⅜ "L"×7′ ¼″ (Car.)	86.15	3.60	3.61	O.K.	O.K.	O.K.	O.K.	O.K.
M-55-2*	5×5×⅜ "L"×7′ ¼″ (Car.)	86.15	3.60	3.61	O.K.	O.K.	O.K.	O.K.	O.K.
M-55-3*	5×5×⅜ "L"×7′ ¼″ (Car.)	86.15	3.60	3.61	O.K.	O.K.	O.K.	O.K.	O.K.
M-55-4‡	5×5×⅜ "L"×7′ ¼″ (Car.)	84.40	3.52	3.61	O.K.	O.K.	O.K.	Under-run 0.006″ to 0.007″ one leg. 0.011″ to 0.014″ other leg.	Allowable under-run=0.009375″
S-55-S1‡	5×5×¼ "L"×7′ ¼″ (Sil.)	59.35	2.48	2.43	O.K.	O.K.	O.K.	Over-run 0.004″ to 0.008″ both legs.	Allowable over-run=0.00625″
S-55-S2‡	5×5×¼ "L"×7′ ¼″ (Sil.)	59.85	2.50	2.43	O.K.	O.K.	O.K.		
S-55-S3‡	5×5×¼ "L"×7′ ¼″ (Sil.)	60.35	2.52	2.43	O.K.	O.K.	O.K.		
S-44-1	4×4×¼ "L"×7′ ¼″ (Sil.)	45.82	1.92	1.94	O.K.	O.K.	O.K.	O.K.	O.K.
S-44-2	4×4×¼ "L"×7′ ¼″ (Sil.)	45.82	1.92	1.94	O.K.	O.K.	O.K.	O.K.	O.K.
S-44-3	4×4×¼ "L"×7′ ¼″ (Sil.)	45.82	1.92	1.94	O.K.	O.K.	O.K.	O.K.	O.K.
M-44-1	4×4×¼ "L"×7′ ¼″ (Car.)	46.57	1.95	1.94	O.K.	O.K.	O.K.	O.K.	O.K.
M-44-2	4×4×¼ "L"×7′ ¼″ (Car.)	45.82	1.92	1.94	O.K.	O.K.	O.K.	O.K.	O.K.
M-44-2	4×4×¼ "L"×7′ ¼″ (Car.)	46.07	1.93	1.94	O.K.	O.K.	O.K.	O.K.	O.K.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

* Straightened under air hammer without heating.
† Taken from stock. Mill report not available.
‡ Could have been rejected due to not being within rolling tolerance for thickness.
(Sil.)—structural silicon steel; (Car.)—structural carbon steel.

tive as a means of determining points of highest stress long before failure occurred, since the coating would flake off, leaving the metal exposed. It may be of interest to record: *a.* That in every case flaking started at one or both ends of the column where the column was in contact with the compression head or the base of the machine; this was probably due to the lack of continuity of the column or to imperfect bearing, or to a combination of both. *b.* That the most noticeable amount of flaking took place in the vicinity of the bolt holes, where the coating flaked off in lines which radiated from the holes at an angle of about 90° and, running from the holes to the toe of the angle, created the form of a truss—with the toe of the angle representing the bottom chord, and the center line of the bolts the top chord. (see Figure 4). It is believed these stress lines in the vicinity of the bolts show definitely that the column strength, especially of the heavier angles, is materially affected by the reduction of the gross cross-sectional area in the fabrication of derrick legs. *c.* In all cases more coating flaked off on the inside than on the back of the angle columns, and the flaking was much more concentrated along or near the toes of the angles than anywhere else. This indicates the tendency of the angle leg to fail along its unrestrained edge by flexing or buckling inward, as would a long, slender plate loaded as a column.

All 8-inch and 6-inch specimens and all 5-inch × 5-inch × ⅜-inch specimens, except M-55-4, failed by crippling of the legs of the angle at or near the top or bottom of the column in the vicinity of the bolt holes. These failures usually followed a tendency of one leg to swing inward, pivoting about the heel; and, when actual failure occurred, one leg kinked inward and the other outward. This is clearly illustrated in the larger columns shown in Figure 3.

The 5-inch × 5-inch × ⅜-inch specimen M-55-4 showed a tendency to fail by crippling at both top and bottom under a 117,000-pound load, but failed definitely by flexure at the center, accompanied simultaneously by crippling near the ends. This column was cut from an angle which had been rejected because the thickness under-run was greater than mill tolerance. The under-run may possibly account for this failure being different from that of other 5-inch × 5-inch × ⅜-inch columns tested.

Of the three 5-inch × 5-inch × ¼-inch silicon specimens, two (marked S-55-S2 and S-55-S3) failed by sudden buckling of both legs at the middle of the 7-foot unsupported length. The other specimen of this size (S-55-S1) first started to bend in the middle, but a definite kink developed at the top, causing failure by crippling in the vicinity of the top bolts. When the load was released, the small amount of bending which had been noted at the middle disappeared.

For the 4-inch × 4-inch × ¼-inch silicon specimens, S-44-1 failed near the middle by sudden buckling. S-44-2 and S-44-3 started to bend in the middle, but actual failure took place by crippling of both legs near the top.

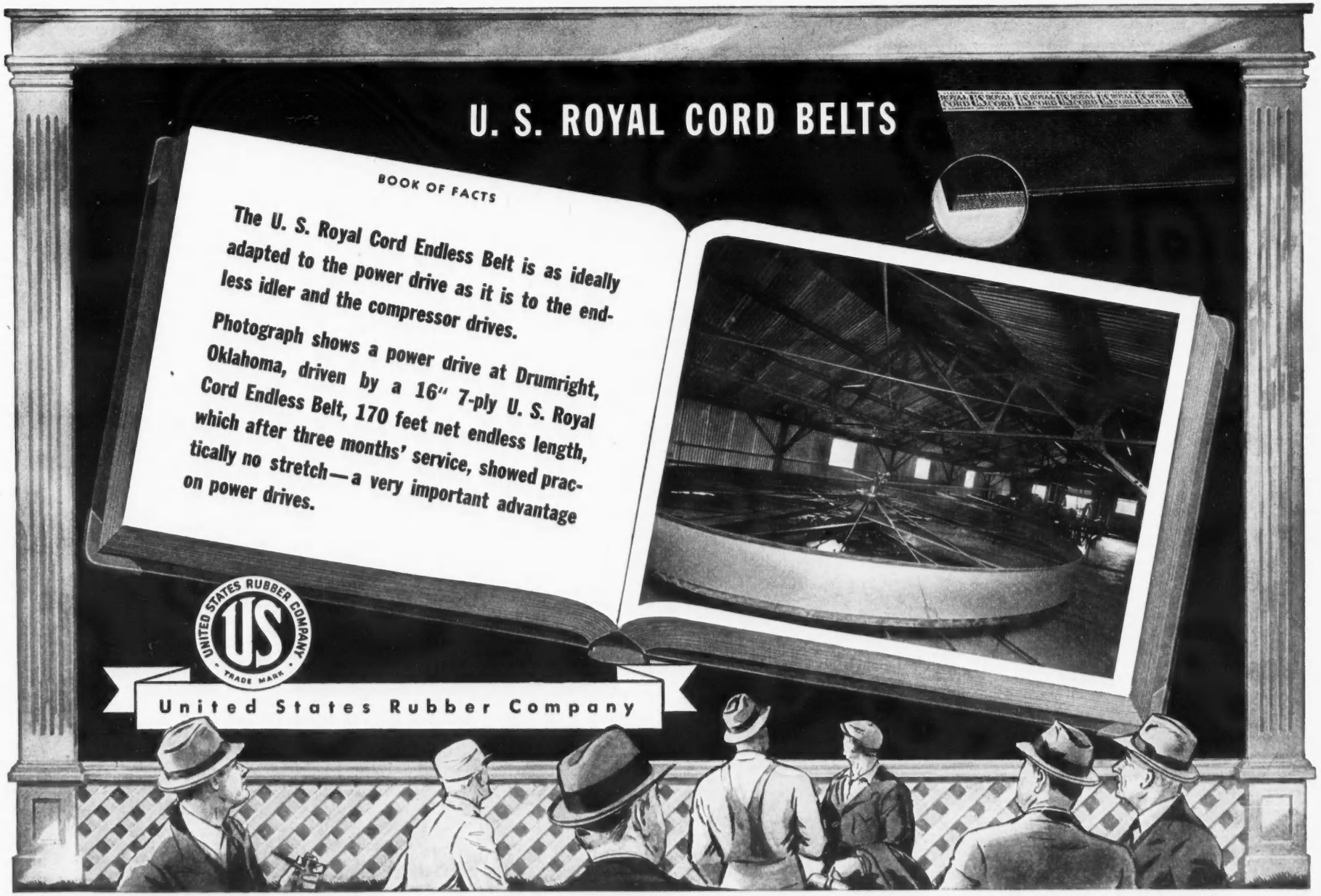
The three 4-inch × 4-inch × ¼-inch carbon-steel specimens presented three distinct types of failure: M-44-1 failed by crippling of the legs near the top, but this was preceded by a noticeable twisting of the top half of the angle about the column center;

TABLE 4

Laboratory-Test Data

Test-Specimen Mark	Description—Both Ends Milled (Inches)	Nominal Column Capacity (A.P.I.) (Pounds)	Total Column Load (Pounds)	Factor of Safety	Allowable Unit Compression Stress for Design (Lb. per Sq. In.)	Actual Average Area (Sq. In.)	Actual Unit Compression at Failure (Lb. per Sq. In.)	Safety Factor Based on Actual Unit Compression Stress
S-88-1	8×8×½ "L"×7' (Sil.)	161,200	309,850	1.92	20,800	7.78	39,826	1.915
S-88-2	8×8×½ "L"×7' (Sil.)	161,200	290,600	1.80	20,800	7.78	37,352	1.796
S-88-3	8×8×½ "L"×7' (Sil.)	161,200	305,500	1.89	20,800	7.77	39,318	1.890
(KINK) S-88-4	8×8×½ "L"×7' (Sil.)	161,200	350,000	2.17	20,800	7.67	45,632	2.194
M-88-1	8×8×½ "L"×7' (Car.)	116,250	247,550	2.13	15,000	7.74	31,983	2.132
M-88-2	8×8×½ "L"×7' (Car.)	116,250	254,500	2.19	15,000	7.78	32,712	2.181
M-88-3	8×8×½ "L"×7' (Car.)	116,250	258,950	2.23	15,000	7.75	33,413	2.227
(KINK) M-88-4	8×8×½ "L"×7' (Car.)	116,250	255,600	2.20	15,000	7.76	32,938	2.196
S-66-1	6×6×⅜ "L"×7' (Sil.)	83,200	196,800	2.36	19,081	4.31	45,661	2.393
S-66-2	6×6×⅜ "L"×7' (Sil.)	83,200	195,000	2.34	19,081	4.31	45,244	2.371
S-66-3	6×6×⅜ "L"×7' (Sil.)	83,200	188,000	2.26	19,081	4.29	43,823	2.297
M-66-1	6×6×⅜ "L"×7' (Car.)	61,460	144,600	2.35	14,086	4.38	33,014	2.344
M-66-2	6×6×⅜ "L"×7' (Car.)	61,460	145,000	2.36	14,086	4.38	33,105	2.350
M-66-3	6×6×⅜ "L"×7' (Car.)	61,460	143,000	2.32	14,086	4.36	32,798	2.328
S-55-1	5×5×⅜ "L"×7' (Sil.)	60,950	162,900	2.67	16,885	3.59	45,376	2.687
S-55-2	5×5×⅜ "L"×7' (Sil.)	60,950	160,000	2.62	16,885	3.57	44,818	2.654
S-55-3	5×5×⅜ "L"×7' (Sil.)	60,950	158,300	2.59	16,885	3.58	44,218	2.619
M-55-1	5×5×⅜ "L"×7' (Car.)	46,430	129,100	2.78	12,861	3.60	35,861	2.788
M-55-2	5×5×⅜ "L"×7' (Car.)	46,430	127,900	2.75	12,861	3.60	35,528	2.762
M-55-3	5×5×⅜ "L"×7' (Car.)	46,430	125,400	2.70	12,861	3.60	34,833	2.708
M-55-4	5×5×⅜ "L"×7' (Car.)	46,430	123,800	2.66	12,861	3.53	33,144	2.577
S-55-S1	5×5×¼ "L"×7' (Sil.)	41,500	78,600	1.89	17,002	2.48	31,693	1.864
S-55-S2	5×5×¼ "L"×7' (Sil.)	41,500	84,000	2.02	17,002	2.50	33,600	1.976
S-55-S3	5×5×¼ "L"×7' (Sil.)	41,500	86,650	2.09	17,002	2.52	34,385	2.002
S-44-1	4×4×¼ "L"×7' (Sil.)	27,000	81,050	3.00	13,917	1.92	42,213	3.033
S-44-2	4×4×¼ "L"×7' (Sil.)	27,000	83,100	3.08	13,917	1.92	43,281	3.110
S-44-3	4×4×¼ "L"×7' (Sil.)	27,000	82,450	3.05	13,917	1.92	42,943	3.086
M-44-1	4×4×¼ "L"×7' (Car.)	21,450	61,550	2.87	11,058	1.95	31,564	2.854
M-44-2	4×4×¼ "L"×7' (Car.)	21,450	59,900	2.79	11,058	1.92	31,198	2.821
M-44-3	4×4×¼ "L"×7' (Car.)	21,450	63,350	2.95	11,058	1.93	32,824	2.968
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

(Sil.)—structural silicon steel; (Car.)—structural carbon steel.


U. S. ROYAL CORD BELTS
BOOK OF FACTS
The U. S. Royal Cord Endless Belt is as ideally adapted to the power drive as it is to the endless idler and the compressor drives.
Photograph shows a power drive at Drumright, Oklahoma, driven by a 16" 7-ply U. S. Royal Cord Endless Belt, 170 feet net endless length, which after three months' service, showed practically no stretch—a very important advantage on power drives.
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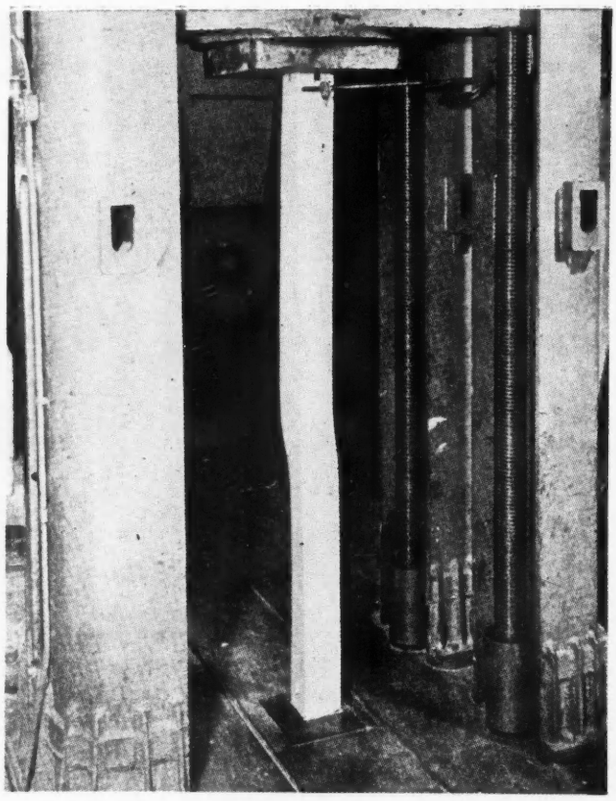

FIGURE 2

M-44-2 failed by crippling of the legs near the top between the first and second bolts; M-44-3 failed by definite buckling of both legs at the middle of the 7-foot unsupported length.

As an additional experiment, one test specimen (which had been previously tested to failure) was placed in the testing machine for the second time to determine the load it would support without further failure. Following are the results:

Test specimen=5-inch×5-inch×⅜-inch "L"×7-foot 0 in. (silicon steel)—mark S-55-1.
Safe working load capacity as a column, as used for design=60,950 pounds (A.P.I.)
Original test—failed at 162,900 pounds (elastic limit) by crippling of legs in vicinity of the bolts near bottom end.
Second test—failed definitely (same point as for first test) at 118,200 pounds, after first having sustained a load of 110,000 pounds.

The above results would seem to indicate that the reduction in gross section by punching holes was a contributing cause of the failure of the angle near the end under the first test; naturally the failure under the second test would come at the same point, following the lines of least resistance. These results may serve as a warning to those users of derricks who would jeopardize lives and equipment (following a failure due to high wind, overloading, etc.) by putting *damaged* legs back into a re-erected derrick. If such practice is followed, the capacity rating of the derrick should be reduced by at least 25 percent. Even then, the derrick could not be considered entirely safe; because the damaged sections, having once been deformed, would have very little resistance to shock loads.

A recapitulation of the tests shows that 10 columns failed by crippling of the legs near the top, 11 by crippling of the legs near the bottom, 4 by buckling of the legs at the center of the column, 3 by combination of flexure at the middle followed by crippling of the legs at the top end, 1 by crippling of the legs near the top accompanied by a twisting of the top half of the column about the column center, and 1 by a combination of crippling at both ends and definite flexure at the middle. Table 5 was prepared to describe the failure of each specimen.

Attention is especially directed to the results obtained in testing to failure the three 5-inch × 5-inch × ¼-inch silicon angles and the three 4-inch × 4-inch × ¼-inch silicon angles. By reference to Tables 4 and 5, it will be seen that the average of the 5-inch × 5-inch × ¼-inch specimens was less than 1,000 pounds stronger than the average of the 4-inch × 4-inch × ¼-inch specimens; that the unit stress at failure of the average 5-inch specimen was only 78 percent as high as that for the average 4-inch specimen; and that the safety factor of the 4-inch specimens was 66 percent higher than the safety factor of the 5-inch specimens. Regardless of the fact that the A.P.I. safe-load capacity rating (41,500 pounds) of the 5-inch × 5-inch × ¼-inch specimen is 53.7 percent higher than the rating (27,000 pounds) of the 4-inch × 4-inch × ¼-inch specimen, these test results seem to indicate that the A.P.I. column formulas are not correct for determining the capacity of angles, when the width of angle legs is greatly out of proportion to the leg thickness. Of course, this discrepancy really originates with the A.I.S.C. specifications. Reference to the chemical analysis of the heats from which these two specimens were derived (see Table 2) *may* partly explain the higher strength of the 4-inch × 4-inch × ¼-inch "L." A study should also be made of Figure 6 for additional information concerning the 5-inch × 5-inch × ¼-"L" test.

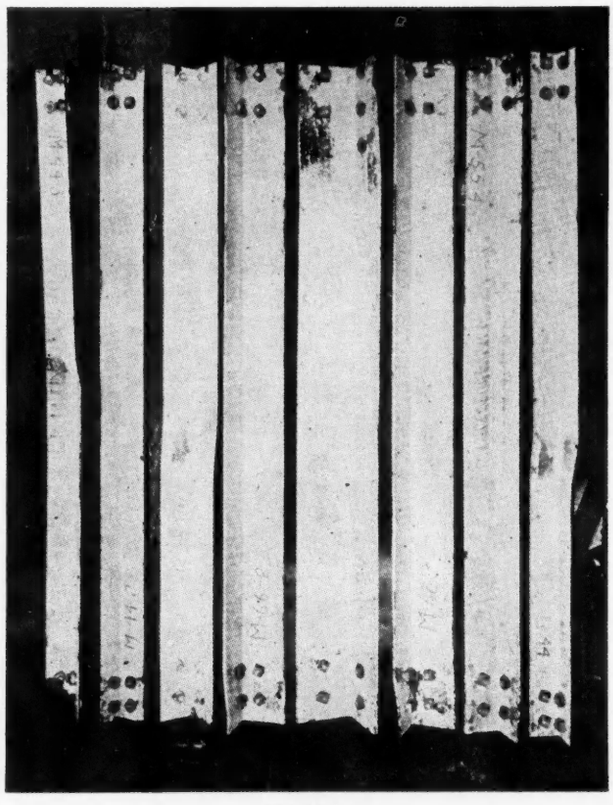

FIGURE 3

BALANCED TRACTION

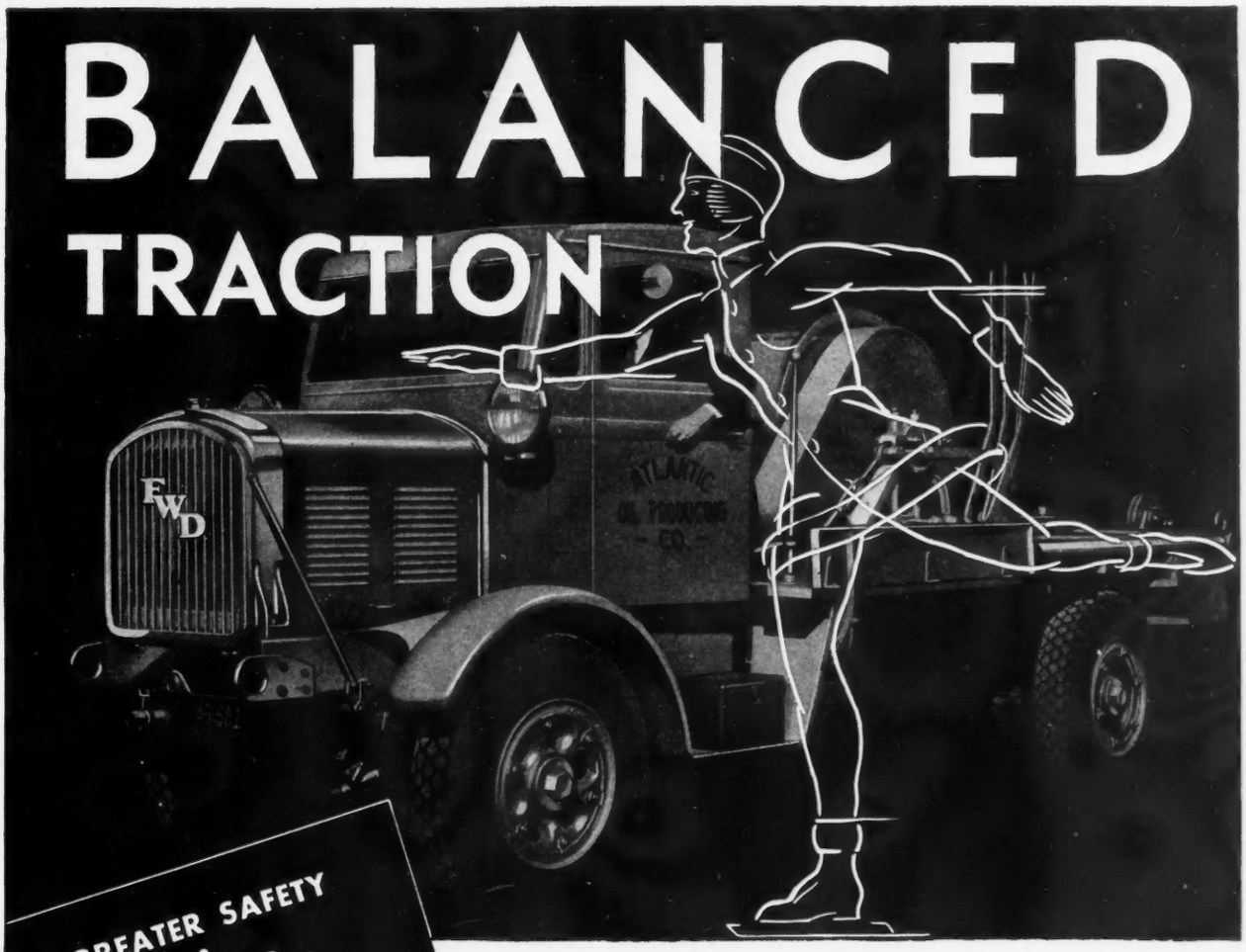

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TABLE 5

Description of Failures

Test-Specimen Mark	Description of Failure—and Comments	Total Column Load (Pounds)
S-88-1	Failed by crippling near top end. No. 1 leg kinked out between 2nd and 3rd bolts, while No. 2 leg kinked inward with point of flexure, starting 15 in. below top or just below 3rd bolt	309,850
S-88-2	Whitewash coating began flaking off in region of bolts at both top and bottom under 240,000-lb. load. Failure occurred by crippling in vicinity of bottom bolts, both legs	290,600
S-88-3 (KINK)	Whitewash coating flaked off slightly on one toe of angle at top when load was increased to 160,000 lb., but flaking then ceased until load reached about 260,000 lb. Failed by crippling in both legs in vicinity of bottom bolts. This specimen came from rolling mill with a definite kink of ⅛ in. to 2½ in. of length, near center, one toe of angle. This was straightened cold in our shop	305,500
S-88-4	Failed near top by crippling of both legs in vicinity of bolt holes—similar to failure of S-88-1	350,000
M-88-1	Failed near top end by crippling of both legs in vicinity of bolts. Failure noticeable first in one leg only	247,550
M-88-2	Failed near bottom and by crippling of both legs in vicinity of bolts	254,500
M-88-3 (KINK)	Failed near top end by crippling of both legs (more apparent in one leg than in the other) in vicinity of 3rd hole from top. This specimen came from rolling mill with definite kink of 3/32 in. in 3 in., near center, one toe of angle. This was straightened cold in our shop	258,950
M-88-4	Failed near top by crippling of both legs—similar to failure of M-88-3	255,600
S-66-1	Failed about 7½ in. from top end by crippling of both legs	196,800
S-66-2	Failed by crippling of both legs—one about 10½ in. from bottom and other about 9½ in. from bottom	195,000
S-66-3	Showed signs of weakness at 175,000-lb. load. Failed by crippling of legs about 5½ in. from top end in vicinity of bolts	188,000
M-66-1	Started flaking off in vicinity of top holes under 112,000-lb. load. Failed by crippling of legs about 6 in. from bottom end, vicinity of 2nd hole from bottom	144,600
M-66-2	Failure generally the same as for M-66-1	145,000
M-66-3	Failure generally the same as for M-66-1 and M-66-2	143,000
S-55-1	Showed signs of weakness at 137,700-lb. load. Failed by crippling of both legs near bottom. This leg was tested a second time and withstood a load of 110,000 lb., but failed quickly at 118,200 lb.	162,900
S-55-2	Failed by crippling of No. 2 leg at top and of both legs near bottom	160,000
S-55-3	Failure same as for S-55-2	158,300
M-55-1	Failed by crippling of legs near bottom	129,100
M-55-2	Failed by crippling of legs near bottom	127,900
M-55-3	Failed by crippling of legs near bottom. (These specimens were cut from an angle taken from our regular derrick stock)	125,400
M-55-4	Started to fail at top and bottom by crippling, under 117,000-lb. load. Failed definitely by flexure in middle. This angle was thinner than allowable mill tolerance	123,800
S-55-S1	Started to fail in middle, but a definite kink developed at the top, causing crippling of the legs in the vicinity of the top bolts. When the load was released, the bending at the middle disappeared	78,600
S-55-S2	Failed by buckling of both legs near the middle of column	84,000
S-55-S3	Failure same as for S-55-S2	86,650
S-44-1	Failed near the middle by sudden buckling	81,050
S-44-2	Started to bend in middle, but failed by crippling of both legs near top	83,100
S-44-3	Failure same as for S-44-2	82,450
M-44-1	Failed by crippling of both legs near top, preceded by a noticable twist in top half of column	61,550
M-44-2	Failed by crippling of both legs near top	59,900
M-44-3	Failed by definite buckling of both legs near the middle	63,350

The laboratory tests show conclusively that the amount of compression, or shortening, in the angle column is directly proportional to the amount of load imposed; i.e., so long as a certain limit is not exceeded, the unit stress bears a constant ratio to the accompanying deformation following Hook's law. The limiting unit stress, of course, varies with each particular material. In plotting the amount of compression against the amount of the load imposed on an angle-column specimen, using the readings taken from the compression dial and the beam, the curve approximates a straight line up to the point where deflection starts. Beyond this point the curve changes direction—which, of course, is due to the lowered resistance of the column in its deflected form.

An interesting result, derived from the laboratory tests, is the fact that if a curve is plotted for any specimen, to show the amount of deflection for various loadings, it will be found that in no case does the deflection exceed 0.05 inches until after the proportional limit has been definitely exceeded.

A comparison of the principal structural carbon-steel column formulas is given in Table 6.

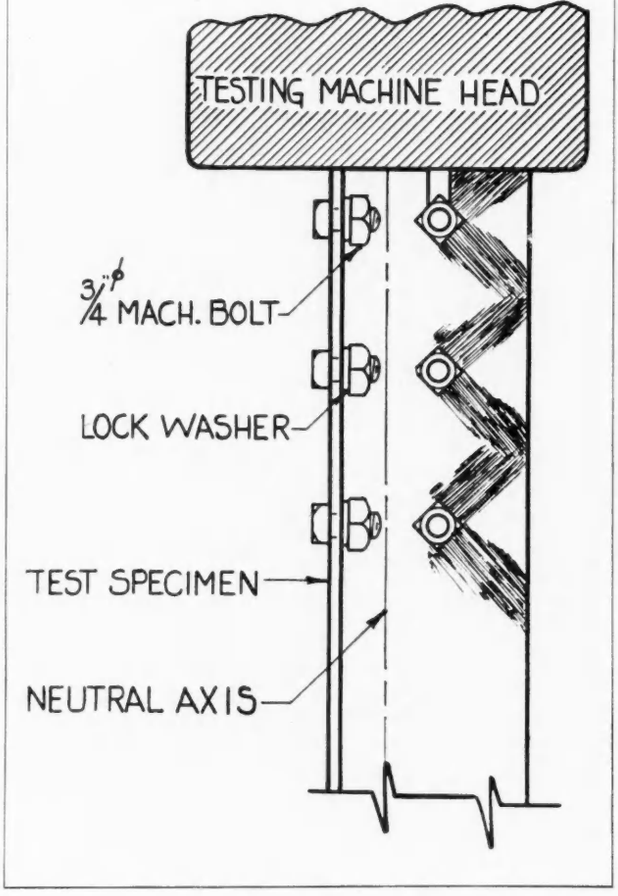
Figure 5 shows, in diagrammatic form, the formulas given in Table 6. Each point connected by a broken line is the average of the results of three or more tests. Upper points were plotted using a safety factor of 2. Lower points were plotted using a safety factor of 2½. In Figure 5 one "KIP" equals 1000 pounds.

Table 7 is similar to Table 6, but compares the commonly-used column formulas for structural silicon steel.

Figure 6, in diagrammatic form, shows the formulas listed in Table 7. Here, as in Figure 5, each point connected by a broken line is the average of the results of three or more tests. Upper points were plotted using a safety factor of 2. Lower points were plotted using a safety factor of 2½. In Figure 6 one "KIP" equals 1000 pounds.

Note that when a safety factor of 2½ is used, as recommended* for structural-steel compression members, the values for the heavier angle columns fall below the values represented by the curves. When a safety factor of 2 is used, all points, except that rep-

FIGURE 4



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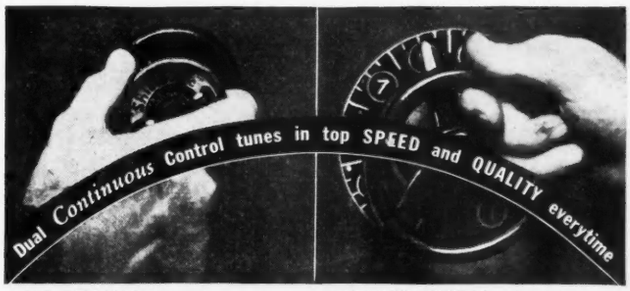

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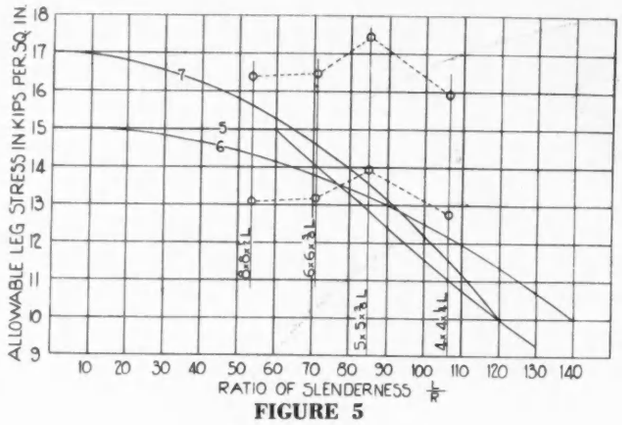


FIGURE 5

resenting the 8-inch × 8-inch × ½-inch silicon angle are above the values represented by the curves. Three of the 8-inch × 8-inch × ½-inch silicon angles had a considerably lower yield point (see Table 2) than other silicon angles tested; this may explain why this size angle falls below the A.P.I. curve.

The slight difference in allowable leg stress between the 8-inch × 8-inch angles and the 6-inch × 6-inch angles (in regular steel) may be accounted for by minor imperfections in material or rolling. The pronounced difference in the allowable stress for the same angle sections in silicon steel is probably due to the higher elastic limit of the 6-inch × 6-inch specimens (see Table 2).

The marked difference in allowable stress between the 5-inch × 5-inch × ⅜-inch "L" and the 5-inch × 5-inch × ¼-inch "L," as shown in Figure 6, should indicate that the standard column formulas should not be applied to those angle sections in which the ratio of leg width to leg thickness exceeds

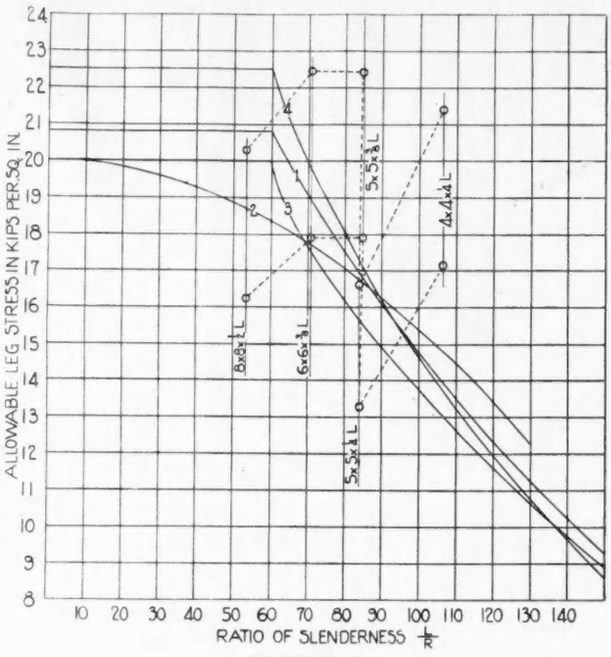


FIGURE 6

16 to 1. This is further evidenced by the fact that the 4-inch × 4-inch × ¼-inch "L" has a much higher allowable leg stress than the 5-inch × 5-inch × ¼-inch "L."

In view of the fact that the broken lines connecting the points obtained from laboratory tests do not follow any curve derived from column formulas, indications are that further research should be undertaken.

TABLE 6
Structural Carbon-Steel Column Formulas

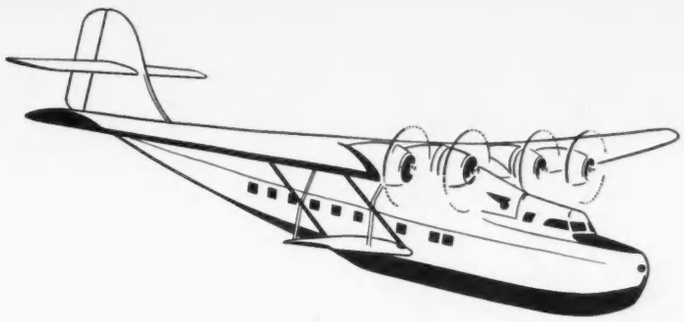
No.	Formula	Specification	Maximum Unit Compressive Stress (Lb. Per Sq. In.)
5	$\frac{P}{A} = \frac{18{,}000}{1 + \frac{L^2}{18{,}000R^2}}$	American Petroleum Institute	15,000
		A steel company*	
		A.I.S.C. prior to 1936 revision	
6	$\frac{P}{A} = 15{,}000 - 0.25\,\frac{L^2}{R^2}$	A.R.E.A. 1935	15,000
		A steel fabricating company†	
7	$\frac{P}{A} = 17{,}000 - 0.485\,\frac{L^2}{R^2}$	A.I.S.C. revised 1936	17,000

NOTE—Formulas 1 to 4, inclusive, are given in Table 7. * Carnegie-Illinois Steel Co. † McClintic-Marshall Co.

TABLE 7
Structural Silicon-Steel Column Formulas

No.	Formula	Specification	Maximum Unit Compressive Stress (Lb. Per Sq. In.)
1	$\frac{P}{A} = \frac{27{,}000}{1 + \frac{L^2}{12{,}000R^2}}$	A.P.I (tentative)	20,800
		A.R.E.A. 1935	20,000
2	$\frac{P}{A} = 20{,}000 - 0.46\,\frac{L^2}{R^2}$	A steel fabricating company*	
		A steel manufacturing company†	
		Proposed by Lee H. Miller, chief engineer for A.I.S.C., 1930	20,000
3	$\frac{P}{A} = \frac{24{,}000}{1 + \frac{L^2}{13{,}500\,R^2}}$	A.S.C.E. 1930	
		As advanced by a steel-derrick manufacturer‡	22,500
4	$\frac{P}{A} = \frac{32{,}100}{1 + \frac{L^2}{8{,}418\,R^2}}$		

* American Bridge Co. † McClintic-Marshall Co. ‡ International Derrick and Equipment Company.



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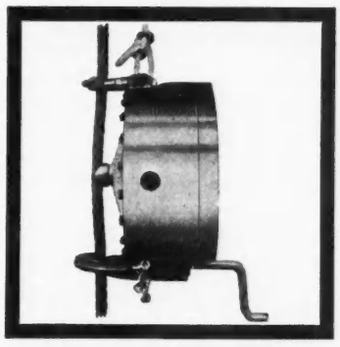

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QUANTITATIVE DETERMINATION OF

The Connate-Water Content of Oil Sands

By HOWARD C. PYLE and P. H. JONES
Union Oil Company of California

QUANTITATIVE methods used for determining the oil and connate-water content of oil sands are described. Dextrose was developed as a tracer material for measuring the contamination of core samples by water from drilling mud. Results of tests at a well show that an average of 38 percent of the effective pore space of the oil sands was occupied by connate water.

IN the calculation of petroleum reserves by volumetric methods it is necessary to know the space volume of the reservoir sands available to oil and gas. A knowledge of only the sand-pore volume is not sufficient, for there is good evidence of the presence of relatively large quantities of connate water in oil sands that produce oil and gas exclusively. The presence of this water has been commented upon by Fettke,[1a] Lindtrop and Nikolaeff,[2] Horner,[3] and others. Garrison[4] attributes the retention of connate water during oil accumulation and later production to greater interfacial tension between the water and the sand grains than that between the oil and the sand grains. He further states that the smaller the sand pore, the greater is the proportional amount of retained water. This may account for the absence of oil in porous shales and the relatively high oil saturation of well-sorted and coarse permeable sands.

Quantitative determinations of formational connate water must usually be made by examining cores taken from the formation. When these cores are obtained from wells in which mud is used as a drilling fluid, it is necessary to know the degree of their contamination by water from the mud with which they are in contact. This paper presents a quantitative method of determining the contamination, as well as the connate-water and oil content of sands; and it is hoped that this discussion will stimulate further quantitative work to the end that the fluid content of oil sands will become more accurately known.

Selection of Tracer for the Determination of the Contamination of Cores by Drilling Fluid

The method used for determining the amount of water in core samples that originated from the drilling mud was to add to the water phase of the mud a tracer material[5, 6, 7] that could be determined quantitatively in the core samples. The requirements for such a tracer are: that it must dissolve in the water of the mud; it must stay in solution in the water regardless of where it may migrate; it must not change during use; and it must be susceptible to quantitative determination in small amounts of water by an analytical method not rendered inaccurate by contamination with oil, sand, clay, etc., with which the water may be associated.

[a] Figures refer to bibliography at end of article.

Reference was found in the literature[3] to the use of arsenic as a tracer in studying water migration; and, consequently, the first efforts were directed toward investigating the possibilities of using this material. Tests were made in which a standard arsenic solution was added in varying amounts to three samples of drilling mud. These samples were shaken thoroughly, and then centrifuged until a clear supernatant liquid was obtained. The arsenic content of this liquid was determined by the Gutzeit method,[8] with the results shown as follows:

	Milligrams of Arsenic Trioxide Per Liter of Water from the Mud		
	Sample No. 1	Sample No. 2	Sample No. 3
Arsenic introduced	5	9.5	19
Arsenic by analysis	2	4	6

From these results it can be seen that the major portion of the arsenic added was either precipitated as insoluble salts or adsorbed by the mud. As a final test, a quantity of mud, treated with sufficient arsenic trioxide to give a calculated content of 20 milligrams per liter of water, was placed in a high-pressure mud-performance testing apparatus,[9] and circulated for 5 hours at 160° F., at a pressure of 2,000 pounds per square inch, over a dry artificial formation. An analysis of a portion of the discharge water received from the apparatus during the latter part of the run showed an arsenic-trioxide concentration of only 0.5 milligrams per liter of water. In Table 1 the results of analyses of the performance-run mud cake and of two successive sections of the artificial formation next to the mud cake are set forth.

These results show that, under the test conditions,

TABLE 1

Sample—	Arsenic-Trioxide Content Found (Milligrams)
Mud cake	more than 0.050
¼-in. section of formation under mud cake	0.017
Next ¼-in. section of formation	0.002

arsenic did not penetrate the artificial formation in appreciable concentrations for more than ½ in., even though complete water penetration was obtained. It is possible that, with other muds and sands, the method might be of value; but, with the particular mud and sand tested, it was obvious that arsenic could not be used as a tracer. No further work was done with this material.

Since the ammonium ion forms very few insoluble salts, and since it is susceptible to precise quantitative determinations, tests were made to investigate the possibility of using it as a tracer. It was found, however, that some oil sands contain sufficient quantities of the ammonium ion to make its use impractical.

The possibilities of lithium were next investigated, and a performance test similar to that used with arsenic was made with lithium-impregnated mud. Spectrographic determinations of the lithium content of the mud and mud cake, of successive sections of the artificial formation, and of the water forced through the formation into the receiver gave results almost identical to those obtained with arsenic. As a consequence, lithium cannot be used as a tracer.

Because the tests using inorganic materials were not satisfactory, it was decided to try an organic material such as phenol. Analyses of phenol-mud mixtures showed that the Koppeschaar analytical method[10] was practical, and that phenol was not lost appreciably from solution by adsorption. A sample of mud was, therefore, treated with phenol, and a performance run made—the run being terminated as soon as the first drop of water appeared in the receiver. The oil sand used in making the artificial core was dried at 220° F., but contained small quantities of residual oil. Results of the phenol determinations are shown in Table 2. The theoretical phenol content of the water in the mud was 5 milligrams per milliliter, which is somewhat lower than that found in the upper 2 inches of the artificial formation, and higher than that found in the third inch. Total theoretical and determined quantities of phenol in the mud cake and formation were 38 milligrams and 36 milligrams, respectively. These values are in relatively close agreement, and indicate that phenol could be used as a tracer. There were, however, two evident objections to the use of phenol. It is oil-soluble and, when mixed with mud fluid, makes the mud susceptible to gas cutting.

TABLE 2

Results of Phenol Determinations—Artificial Formation

SAMPLE	WEIGHT—Grams			PHENOL		
				Calculated	Determined	
	Wet	Dry	Water	Milligrams	Milligrams	Milligrams per Milliliter of Water
*Mud cake	3.46	2.35	1.11	6	0.7	0.6
First inch	25.74	23.41	2.33	12	14	6
Second inch	27.10	24.73	2.37	12	14	6
Third inch	17.31	15.70	1.61	8	7	4

* Data covering mud cake are regarded as unreliable due to very small quantities of materials available for testing.

The copper-reduction method[11] for determining dextrose is known to be extremely precise. By preliminary tests it was found that the dextrose content of mud can be determined by diluting the mud with an equal weight of water and analyzing an aliquot portion of this mixture without centrifuging out a supernatant layer of water. A performance test using the same procedure followed in investigating phenol was then made with a mud containing 5.2 milligrams of dextrose per milliliter of water. For analysis, 20 milligrams of water was added to a weighed sample of artificial formation; the mixture was agitated thoroughly; and, after standing a few minutes, a 10-milligram aliquot portion of the supernatant liquid was pipetted off for a dextrose determination. Results of these analyses are shown in Table 3.

It was, of course, fortuitous that the total quantity of dextrose found by analysis was exactly the same as that computed as having been added to the water found in the artificial formation. These data demonstrate the fact that dextrose was not absorbed or altered by either the mud or the artificial formation sand, and that dextrose would serve as a satisfactory tracer. It was observed, however, that dextrose mud mixtures fermented on standing, but that octyl alcohol, to the extent of only 0.05 percent by weight of the water in the mud, prevents this fermentation. The presence of the alcohol does not interfere with the dextrose determinations nor impair the value of the mud. Since a suitable drilling well for a test was available at this time, laboratory investigations with varying dextrose concentrations were not made.

TABLE 3

Results of Dextrose Determinations—Artificial Formation

SAMPLE	Water Content* (Milliliters)	DEXTROSE			
		Calculated		Determined	
		Milligrams per Milliliter of Water	Total Milligrams	Milligrams per Milliliter of Water	Total Milligrams of Water
Mud cake	1.50	5.2	7.8	5.8	8.8
First inch	2.72	5.2	14.1	4.9	13.2
Second inch	3.24	5.2	16.8	5.1	16.6
Third inch	3.47	5.2	18.0	5.2	18.1
Totals	....	5.2	56.7	5.2	56.7

* Determined by loss of weight at 220° F.

For the large-scale work at the well, dextrose was used in the form of a refined corn sugar. The octyl alcohol used was a commercial grade (2-ethyl hexanol).

Procedure at the Well

The well suitable for the test was located in a field of the Los Angeles basin, where water-free oil production was known to be available. Bottom-hole pressures in the vicinity of the well were of the order of 600 pounds per square inch. Producing sands were of medium to coarse grain, rather well sorted, substantially free from cementing material, and only slightly consolidated. Initial production of from 400 barrels to 500 barrels per day was expected, with a gas-oil ratio of approximately 300 cubic feet per barrel. This well had just had a water string of casing successfully cemented above the interval to be cored and sampled.

At the well, dextrose and octyl alcohol were added to fresh mud by batches in the mud-pump suction pit as follows: While well-mixed mud was being pumped into

the suction pit, a dextrose solution and octyl alcohol were added at constant rates—all three ingredients passing over the shaker screen on entering the pit. This mixed batch contained 438 cubic feet of mud and 12.7 cubic feet of dextrose solution containing 200 pounds of commercial dextrose and 3 gallons of octyl alcohol. Additional mixing was effected in the suction pit by circulating for 30 minutes through two hydraulic giants. Following a small slug of water, which was used as a marker, the content of the suction pit was pumped into the drill pipe with the bit just off bottom. The mixing procedure was then repeated until four separate batches had been prepared and the return of the water-slug marker effected.

With only treated mud in the circulation system the well hole was cleaned to bottom (from 3,055 feet to 3,067 feet), the drill pipe was removed, the drill bit was replaced with a core head and telescoping barrel,

FIGURE 1

Graphic Log and Electric Core Record of Test Interval Showing Core and Sample Sequences

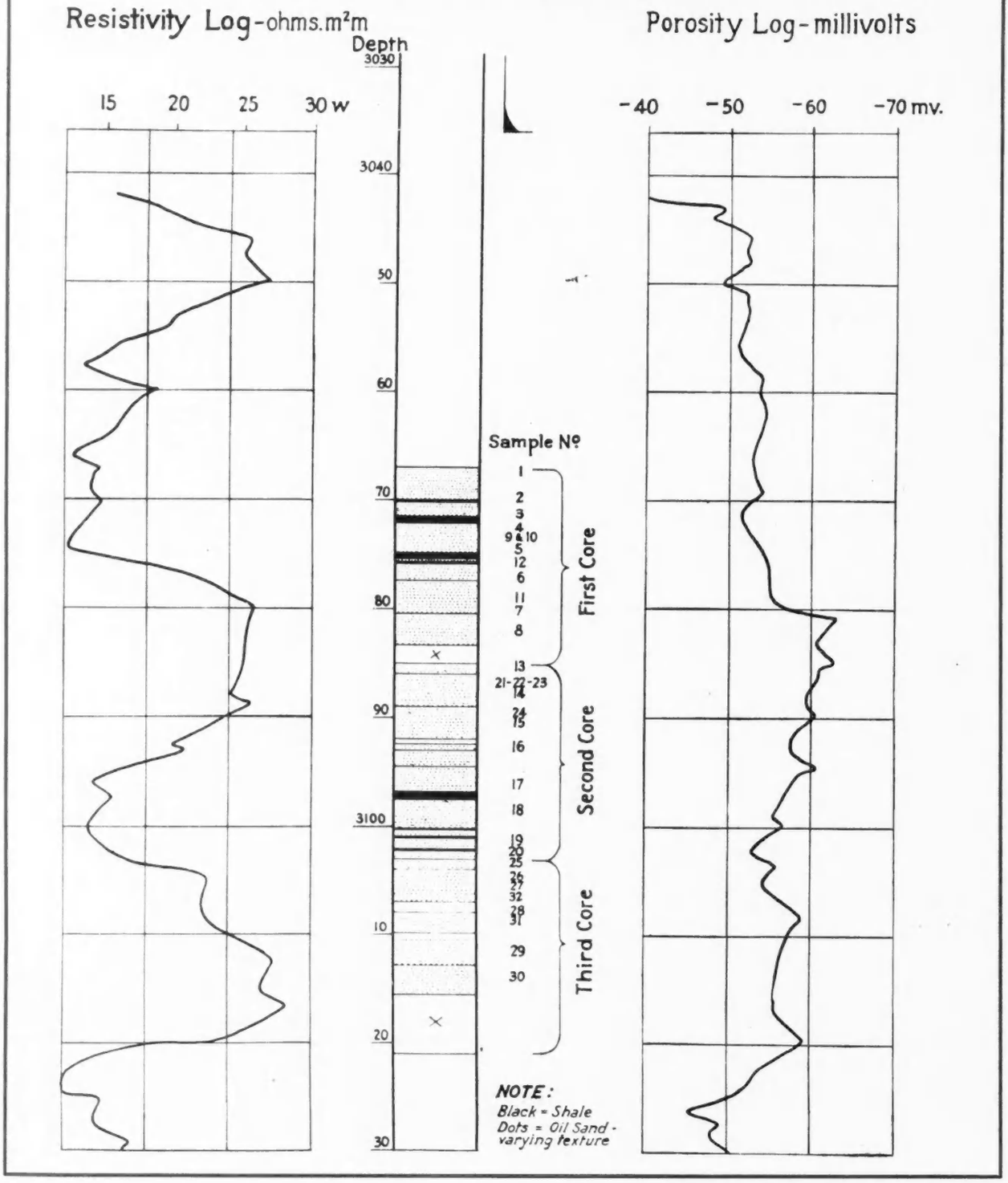


Table 4

Analysis of Samples of Mud Taken While Circulating and Coring at Well

Mud Sample No.	Description of Sample	Dextrose (Percent by Weight of Mud)	Mud (Lb. per Cu. Ft.)	Water in Mud (Percent by Wt.)
1	Treated mud to well, batch 1...	0.60	72.3	77.6
2	Treated mud to well, batch 2...	0.61	71.5	79.2
3	Treated mud to well, batch 3...	0.64	71.5	79.2
4	Treated mud to well, batch 4...	0.64	71.5	79.6
5	First returns of treated mud from well.....	0.61	71.6	78.5
6	Ditch to screen. This mud at core head at depth of 3,074 ft..	0.62	71.5	78.7
7	Ditch to screen. This mud at core head at depth of 3,077 ft..	0.64	71.6	78.6
8	Ditch to screen. This mud at core head at depth of 3,080 ft..	0.63	71.6	78.5
9	Ditch to screen. This mud at core head at depth of 3,092 ft..	0.63	71.4	78.8
10	Ditch to screen. This mud at core head at depth of 3,098 ft..	0.63	71.4	78.1
11	Ditch to screen. This mud at core head at depth of 3,109 ft..	0.63	71.7	77.9

and the drill pipe was run into the hole. Mud circulation was established and continued for 30 minutes, with the core head at bottom, following which an 18-foot core was taken. During the period of mud circulation and coring, the mud in the pump suction pit was kept well mixed by pumping it through the hydraulic giants. Three 18-foot cores were taken in this manner, and excellent recovery was attained. A graphic log and electric core record of the interval thus cored are shown in Figure 1. To prevent dilution of the mud, water was not used to wash the drill pipe as it was pulled from the hole between cores, and no make-up water was added at any time.

Samples of each treated batch of mud and samples of the mud stream at frequent intervals during both circulation and coring were taken and analyzed, with the results shown in Table 4. It is evident from these data that a mud of essentially uniform weight, and of essentially uniform water and dextrose content, was used throughout the coring operations—the average dextrose content of the water in the mud being 0.80 percent by weight.

Cores were sampled (see Figure 1) as soon as they were withdrawn from the core barrel, and each sample was separately wrapped in waxed paper (lead foil would have been preferable) and sealed in tins. In sampling, care was taken to remove only the mud sheath from about the core and to prevent crushing or otherwise disturbing the friable sands. The condition of the first two cores showed conclusively that there had been neither fracturing nor rolling of the material of the core in the core barrel. There was, however, evidence of fracturing in portions of the third core, but these fractured sections were avoided in sampling.

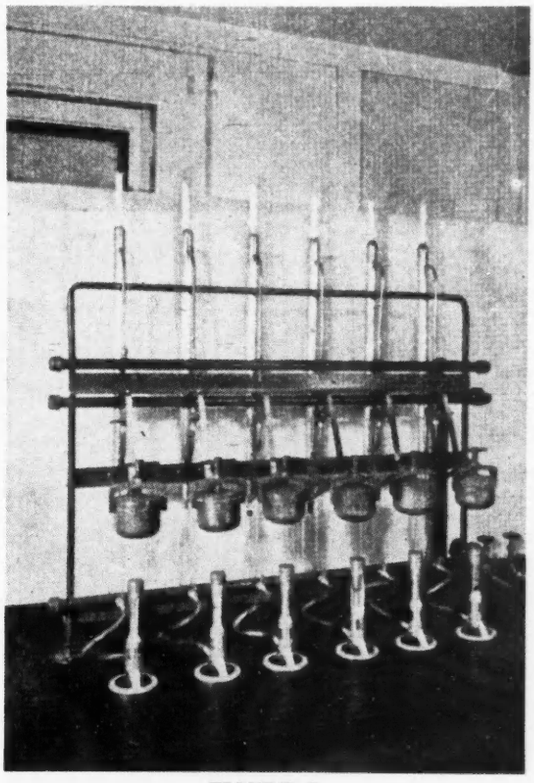


FIGURE 2

Retorts Used for Making Oil and Water Determinations

Laboratory Procedure

Determination of Core Contents: In the laboratory the core samples were removed from their tin and paper containers, each sample was broken down to grain size, thoroughly mixed, and divided into two parts. One part (approximately 175 grams) for oil and water determinations was placed in an iron retort, and the other (approximately 30 grams) for subsequent dextrose determination was preserved in a pre-weighed, wide-mouth, glass-stoppered bottle. In carrying out these

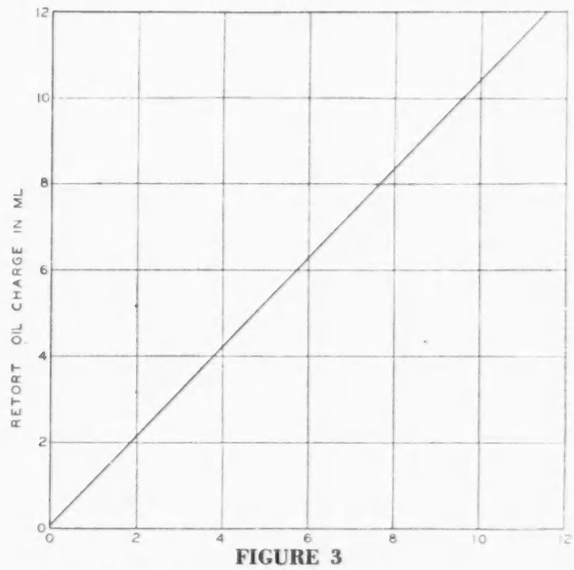


FIGURE 3

Retort-Oil Charges Plotted Against Condenser-Oil Recoveries

operations the samples were exposed to the atmosphere for about 3 minutes. The iron retorts, which are illustrated in Figure 2, were heated slowly to a dull red with a gas burner, held at that temperature for 40 minutes, and then allowed to cool. Calcium-chloride tubes, located at the top of the retort condensers, prevented any moisture from being drawn into the retort systems on cooling. The condensate from each retort was recovered in a centrifuge tube, which was later centrifuged for 5 minutes, and its oil and water contents were read to the closest 0.1 milliliter. After the retort had cooled, the sand was removed from it and weighed.

To determine the extent of oil and water losses in retorting, known quantities of oil, water, and previously-

retorted core sand were mixed and retorted. Oil losses were found to vary directly with the initial charged volumes, the losses amounting to approximately 0.4 milliliter per initial 10 milliliters. Figure 3 shows retort-oil charges plotted against condenser-oil recoveries. Water losses were found to be independent of initial charged volumes, and amounted to 0.2 milliliter. Also, the recoverable amount of water of crystallization from the average material of the core samples was determined by testing several representative composite samples taken from all the core sands. These composite samples were leached with carbon tetrachloride in Soxhlet extractors for 24 hours, and then dried at 215°F. for 4 hours. Water recovered by retorting, after correcting for retort water losses, averaged 0.3 milliliter per 100 grams of unretorted oil-free dry sand. Corrections as outlined were applied to the measured oil, and water condensates from the core samples retorted—the corrected quantities being recorded in milliliters per 100 grams of oil-free, dry, unretorted sand.

Determination of Core Porosity

Samples used for porosity measurements were taken adjacent to those used for analytical determinations. The samples were trimmed to the desired size, leached with carbon tetrachloride in Soxhlet extractors, dried at 215° F., and weighed. Bulk volumes were measured by mercury displacement, and effective pore volumes were measured by a Coberly-Stevens hydrogen porosimeter.[12] The bulk-volume measuring apparatus, the hydrogen porosimeter, the pressure-reducing valve for hydrogen, and the Crosby fluid-pressure scale of 300-pounds-per-square inch range are shown in Figure 4. Porosity values were recorded in percentages as well as in milliliters per 100 grams of oil-free dry sand.

Had there been a possibility that any of the sand pores were isolated by cementing material, it would, of course, have been necessary to measure total porosity rather than effective porosity in order to determine the space available for oil and gas, and water.

Average oil-free dry-sand densities were determined by the pycnometer-tetrachlorethane method, and used to correlate core contents with core pore volumes. This was believed to be a safe procedure, as only extremely small variations in sand composition and, therefore, in sand-grain densities would be expected.

Determination of Dextrose Content of Core Samples

The weights of the samples to be used for dextrose analyses were determined, 25 milliliters of distilled water was pipetted into each bottle, and the contents thoroughly agitated. After settling, 10 milliliters of supernatant liquid was pipetted into a flask, and its dextrose content determined. The known data available consisted of the weight of the sand plus the oil and water in the sample, the weights of oil and water originally present in the sample, the volume of water added, the volume of the aliquot portion removed for the dextrose determination, and the dextrose content of the portion. From these data the quantity of water found in the sample which had come from the drilling mud was computed and recorded in milliliters per 100 grams of oil-free dry sand.

Results of Laboratory Tests of Core Samples

Results of laboratory tests on 28 samples secured at the well are shown in Table 5.

These data show that there are no simple relations between sand texture, oil and connate-water content, and degree of core contamination. The relative contami-

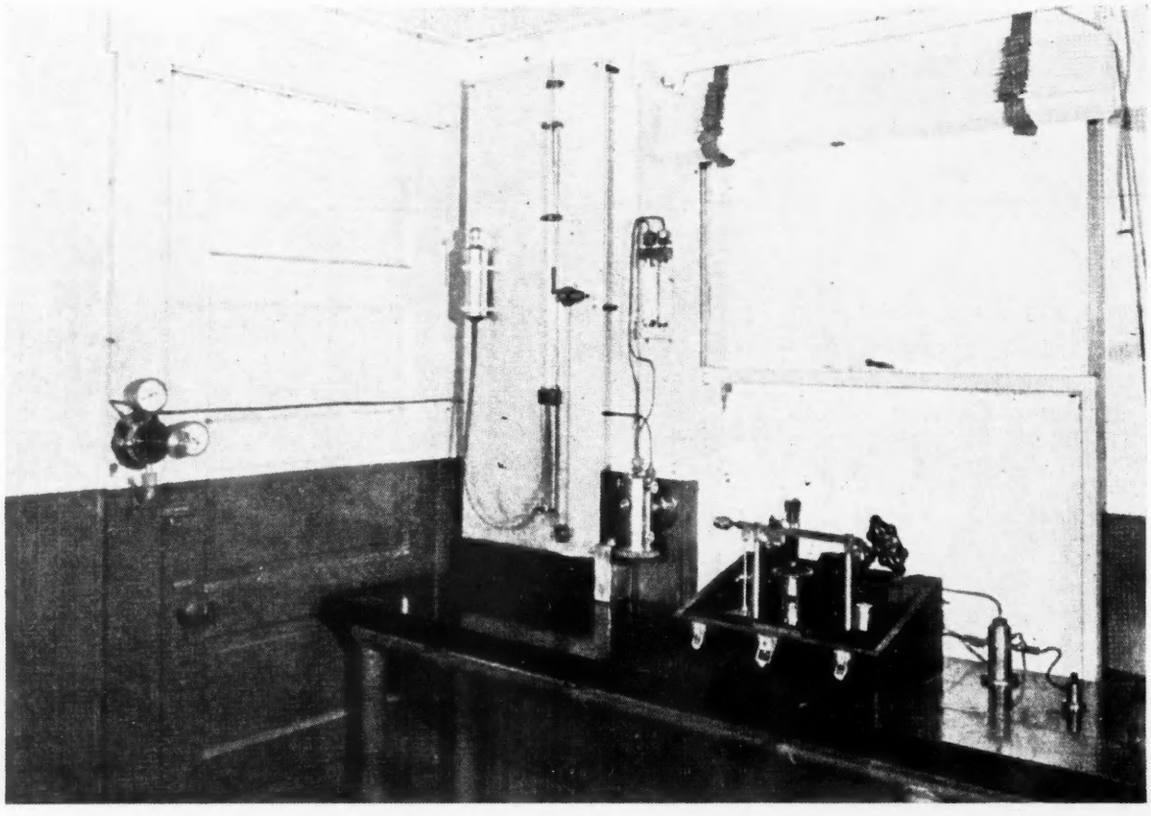
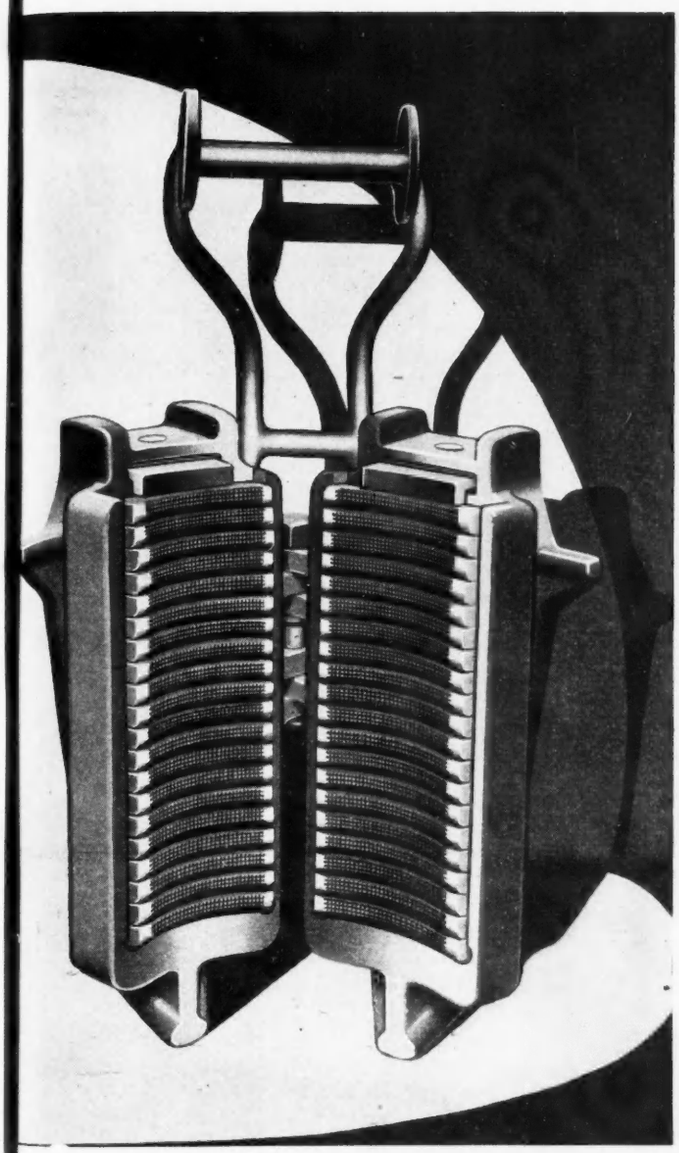


FIGURE 4
Apparatus Used in Determining Porosity

ROUND TRIPS MADE QUICKLY

With MISSION SLIPS



SAVING MONEY FOR THE OPERATOR:

The greatest cause of delays in handling pipe, namely, sticking in the bowl, is positively eliminated through that outstanding principle which distinguishes Mission Slips from all others: . . . . . .

ROLLING DOGS

★

INSTANT RELEASE

is assured because the dogs roll from the pipe as it is pulled. Positively will not damage pipe.

CONSTANTLY MAKING MONEY-SAVING RECORDS ON DEEP WELLS AND ALL WELLS

THE WORLD OVER

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HUMBLE ROAD - - - - - HOUSTON, TEXAS

Mission Slips . . . . Mission Valves . . . . Mission Pistons . . . . Mission Piston Rods . . . . Mission Swabs

SOLD THROUGH SUPPLY STORES EVERYWHERE

nation of sand samples taken at the top and bottom of each core and that of samples taken immediately above and below the shale strata encountered do not indicate the migration of water from the drilling mud for appreciable distances ahead of the core bit. This may have been due largely to the excellence of the mud used with respect to its ability to prevent loss of water to the formation, and to the fact that the average coring rate was in excess of 8 feet per hour.

However, even if water from the drilling mud had migrated ahead of the core bit, the very nature of the occurrence of connate water is such that it is unlikely that a significant change in the relation of connate water to oil sand would have resulted.

Samples of formation oil sands from the core barrel contained relatively large quantities of water. An average of 29 percent of the water was found to be from the drilling fluid; and, therefore, this quantity was foreign to the oil formation in place. The balance of the water, being connate, should be deducted from the total pore volume of the sand formation in order to obtain the net pore volume available to oil and gas. An arithmetical average of these deductions is approximately 38 percent; i.e., that an average of 38 percent of the total effective pores of the sands contained connate water. On an average, half of the remaining or net effective pore volume contained oil, and the other gas.

These average values of formation contents are predicated on the assumption that expansion of the gas content of the sand on reduction of pressure, as the cores were taken from the well, did not cause loss of fluid, since an inspection of the cores showed no evidence of such action. No corrections were made for fluids lost by evaporation while the cores were exposed to the atmosphere at the well or in the laboratory, because the rapid handling of the samples precluded the possibility that such losses could be of sufficient magnitude to impair seriously the accuracy of the results. Possible errors in determining the quantity of water from the drilling fluid would have only small influence on calculated connate-water volumes because of the low ratio of drilling-fluid water to connate water. Since sand porosities were determined for samples taken adjacent to those used for fluid-content measurements, errors may be involved in assigning fluid content to pore volumes. In all cases, however, the adjacent sampling was such that there were no perceptible differences in sand textures.

In general, it is believed that the method used gives satisfactory results of such magnitude that they are of importance in estimating the fluid contents and the net effective pore volumes of oil-sand formations. It is not considered that data thus far accumulated are sufficiently complete for general application; and it is, therefore, intended to expand the work to include a variety of oil-formation conditions.

The authors wish to acknowledge the assistance of J. E. Sherborne, E. W. Hart, and E. C. Babson, all of Union Oil Company, who made many of the laboratory tests reported. Sherborne also aided in treating the mud at the well and in securing the core samples.

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TABLE 5
Results of Tests on Well-Core Samples

Sample No.	Depth (Feet)	Sand Texture*	Volume of Oil (Milliliters per 100 Grams of Dry Sand)	Volume of Connate Water (Milliliters per 100 Grams of Dry Sand)	Volume of Drilling Water (Milliliters per 100 Grams of Dry Sand)	Total Fluid Volume (Milliliters per 100 Grams of Dry Sand)	Effective Pore Volume (Milliliters per 100 Grams of Dry Sand)	Effective Pore Volume Filled by Total Fluid (Percent)	Total Effective Porosity (Percent)	Total Effective Pores Filled with Connate Water (Percent)	Net Effective Porosity (Exclusive of Connate Water) (Percent)	Oil Saturation (Percent of Net Effective Pores)
1	3,068	M	4.3	7.7	2.1	14.1	15.8	89.2	29.1	48.7	14.9	53.1
2	3,069	M	6.0	7.2	1.4	14.6	16.0	91.2	29.8	45.0	16.4	68.2
3	3,072	M	7.8	6.6	2.8	17.2	18.3	94.0	32.6	36.1	20.8	66.7
4	3,072	M-C	5.6	7.0	1.5	14.1	16.9	83.4	30.8	41.4	18.0	56.6
5	3,074	M-C	5.6	7.3	1.2	14.1	15.7	89.8	29.1	46.5	15.6	66.7
9	3,074	M-C	3.5	4.5	2.3	10.3	14.0	73.6	26.9	32.1	18.3	36.8
12	3,076	M	6.9	6.5	1.2	14.6	15.1	96.7	28.4	43.0	16.2	80.2
6	3,077	M	5.7	5.2	4.2	15.1	18.2	83.0	32.5	28.6	23.2	43.8
11	3,078	M	5.5	5.7	3.1	14.4	17.5	82.3	31.5	32.6	21.2	46.6
7	3,079	M-C	6.3	4.0	3.2	13.5	18.7	72.2	33.1	21.4	26.0	42.9
8	3,082	M-C	4.2	8.1	1.5	13.8	†	....	....	....	....	....
13	3,086	C	2.4	6.0	0.9	9.3	14.1	66.0	27.1	42.6	15.6	29.6
22	3,087	M-C	3.7	4.6	1.0	9.3	12.9	72.1	25.2	35.7	16.2	44.6
14	3,088	M-C	2.9	6.2	1.2	10.3	12.5	82.4	24.6	49.6	12.4	46.0
24	3,089	C	3.2	4.4	1.4	9.0	12.7	70.9	24.9	34.6	16.3	38.6
15	3,091	C	5.5	4.8	0.9	11.2	12.7	88.2	24.8	37.8	15.4	69.6
17	3,096	M	2.7	7.2	1.4	11.3	†	....	....	....	....	....
18	3,097	M	5.7	4.8	4.0	14.5	18.3	79.2	32.8	26.2	24.2	42.2
19	3,101	F	2.2	12.9	4.1	19.2	†	....	....	....	....	....
20	3,102	F	2.4	12.6	4.0	19.0	†	....	....	....	....	....
25	3,104	M-F	5.5	6.9	4.1	16.5	21.5	76.7	36.2	32.1	24.6	37.7
26	3,105	M-C	4.3	6.5	3.9	14.7	16.5	89.1	30.2	39.4	18.3	43.0
27	3,106	M-C	3.4	6.9	2.5	12.8	15.5	82.6	28.9	44.5	16.0	39.5
28	3,108	M	4.3	4.6	5.8	14.7	20.7	71.0	35.4	22.2	27.5	26.7
32	3,109	M	3.8	8.5	1.4	13.7	13.9	98.6	26.8	61.2	10.4	70.4
31	3,112	M	5.0	6.4	4.2	15.6	19.2	81.3	33.5	33.3	22.3	39.1
29	3,115	M	3.3	8.8	2.2	14.3	†	....	....	....	....	....
30	3,117	C	3.1	5.1	1.5	9.7	†	....	....	....	....	....
‡Average	.....	....	4.86	6.01	2.47	13.35	16.21	82.4	29.7	37.9	18.6	49.5

* Sand-texture symbols: C—coarse-grained; M—medium-grained; F—fine-grained.
† Porosity indeterminable due to friable nature of sand.
‡ Does not include samples 8, 17, 19, 20, 29 and 30.

Markets Still Firm

PRICES STEADY FOR CRUDE AND NEARLY ALL PRODUCTS

THE oil industry's markets have continued on a firm basis, with prices steady for gasoline as well as fuel oils and kerosene. The crude oil markets naturally are bolstered by the comparatively strong situation for most of the petroleum products, and by the present fairly satisfactory control of crude production.

Even the low octane gasolines have been moving lately in good volumes at unchanged price levels.

Although there was some weakness a few weeks ago in the third grade gasoline tank car market in East Texas, purchases by the larger companies have removed practically all surplus material, and most of the refiners of the district have found adequate markets for their normal plant output for the next several weeks.

Little Hot Oil Now

The present firmness of the gasoline market in East Texas, and in fact in the whole Mid-Continent, is partially the result of the current low level of hot oil production and refining. The surreptitious traffic in hot oil is indicated to be down to the relatively insignificant average level of about 7000 barrels daily.

At this time last year the hot oil output was averaging around 35,000 barrels daily, and even that volume was looked upon at that time as comparatively low. In still earlier periods, especially before enactment of the Connally Act in early 1935, it was not unusual for unauthorized production of crude oil in East Texas to range around 75,000 or 100,000 barrels daily.

In those times, significantly, the gasoline markets were discouragingly unstable, from refinery to service station, and prices never were as favorable as those currently prevailing. Furthermore, the unstable gasoline market exerted constantly a depressing effect on the crude oil markets.

The present comparatively strong markets for most of the petroleum products indicate that there is some sound basis for producers' hopes of moderate crude price advances within a few months.

Control May Be Difficult

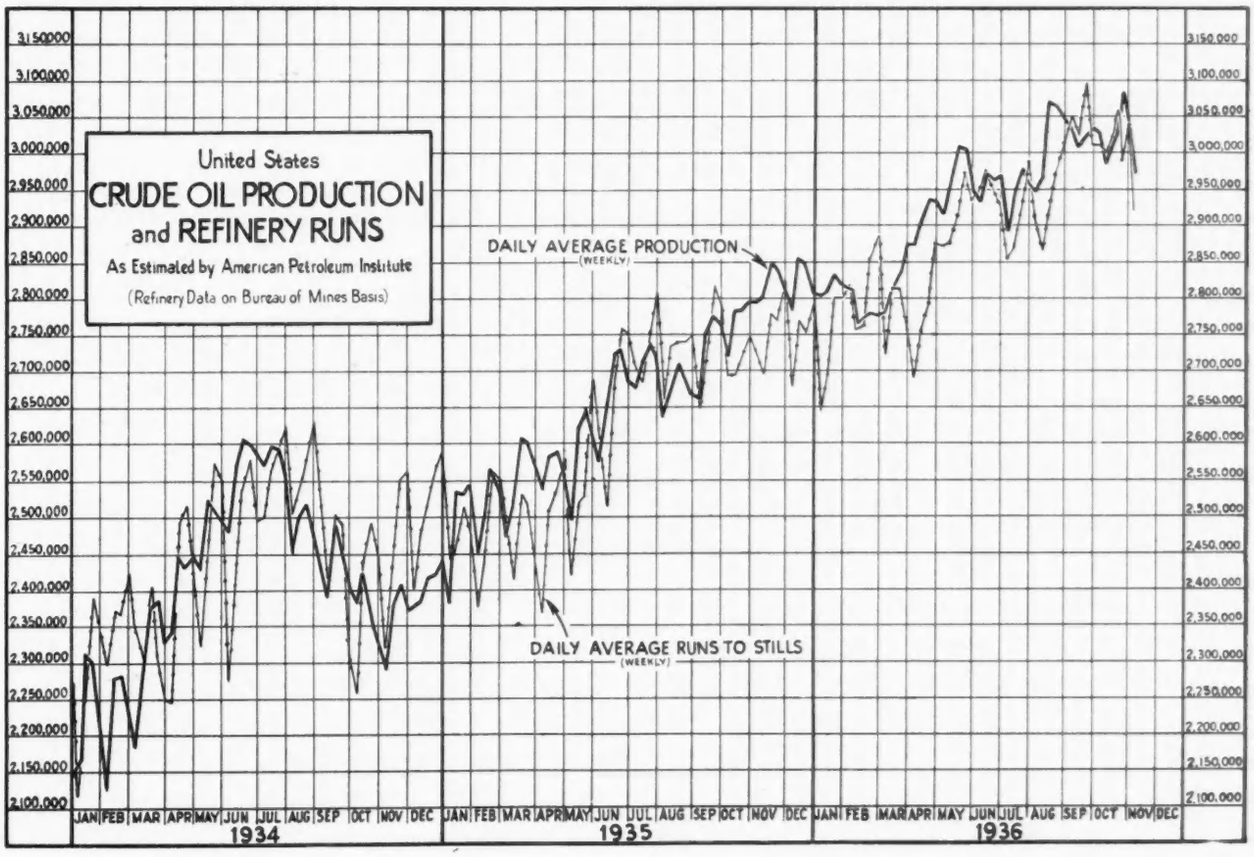
At the same time, the outlook is somewhat obscured by the possibility that serious difficulties may arise in the coming months over crude production control.

Some slackening of the restraints on crude oil production would not be surprising, because of rivalry of the different states for the available markets and because of increased difficulty of fitting new wells into the proration picture.

Already the curb on crude production has been relaxed to the extent that crude storage withdrawals no longer are prescribed under the national program, and the oil formerly taken from storage now is being taken from the wells. If crude production should be allowed to go still higher to an extent that would cause important additions to storage, the markets quite likely would be adversely affected.

Tank Car Prices Same

Throughout the Mid-Continent, refinery



prices last week were largely unchanged from those of the week before.

Gasoline tank car prices were generally the same as previously. The prices on U. S. motor gasoline f.o.b. Oklahoma refineries appeared to continue within the following range: 62 octane and below, 4⅝ to 4⅞ cents a gallon; 63 to 67 octane, 5 to 5⅜ cents; and 68 to 70 octane, 5⅝ to 5¾ cents.

Corresponding prices in the Chicago market were 4½ to 4¾ cents, 4¾ to 5¼ cents, and 5⅜ to 5¾ cents.

In East Texas, fully tendered U. S. motor gasoline below 62 octane was priced at 4½ to 4⅝ cents a gallon.

In the Chicago market, the No. 1 fuel oils were not sold under 3¼ cents a gallon, whereas the minimum quotation had been 3⅛ cents the week before. As in the previous week, the price range was up to 3½ cents. The No. 2 fuel oils in the Chicago market continued at 3 to 3¼ cents. In the Oklahoma market, the No. 1 oils, f.o.b. refineries, ranged from 3¼ to 3⅜ cents, and the No. 2 oils from 3⅛ to 3¼ cents, no changes having occurred in the district.

Kerosene prices again remained generally unchanged. At the Oklahoma refineries, the 41-43 water white grade was priced at 3⅜ to 3½ cents, and the 42-44 water white grade at 3½ to 3⅝ cents. Corresponding prices in the Chicago market were 3⅜ to 3½ cents and 3½ to 3⅝ cents.

East Texas Tank Car Shipments

Week Ending November 8, 1936

PRODUCTS	No. Cars	Estimated Gallons
Gasoline	737	5,980,446
Fuel Oil	217	2,051,089
Casinghead Gasoline	95	825,262
Distillate	94	756,338
Topped Crude	29	272,011
Gas Oil	19	141,742
Kerosene	7	54,731
Residuum	4	32,387
Naphtha	4	26,390
Total	1,206	10,140,396
Total Previous Week	1,193	10,130,407
Interstate	455	.....
Coastwise	413	.....
Intrastate	338	.....
Total	1,206	.....

RODESSA YIELD

Shreveport. — Opinions vary materially on the ultimate recovery from the Rodessa field, but many of the engineers working on the problem now are using a basis of 800 barrels per acre foot in determining the ultimate recovery. The maximum number of feet of saturation in the Young oil horizon in that field is 53 feet.

RECORD IS SET

Daily crude oil runs to stills reach new peak

Washington, D. C. — Establishing a new high daily average of 3,014,000 barrels, runs of crude oil to stills in September totaled 90,872,000 barrels, it was reported November 12 by the United States Bureau of Mines.

With fuel and losses at 653,000 barrels, consumption was materially in excess of receipts at refineries, which totaled 90,442,000 barrels, the bureau announced, resulting in a reduction of stocks from 59,443,000 barrels September 1 to 58,360,000 barrels at the close of the month. The rate of decline in stocks, it was said, was slower than during the preceding month.

Of the 90,442,000 barrels of crude received at refineries during September, the report showed, 87,598,000 barrels were domestic and 2,844,000 barrels foreign oil.

ALBERT ADKISSON, Fort Worth operator with properties in the East Texas and Talco fields, spent the past week end at Detroit, Michigan, after attending the oil convention at Chicago.

WILLIAM G. BLANCHARD, Miami, Florida, is now associated with the recently incorporated All Floridoil Corporation as executive vice president.

KEROTEST THROTTLE VALVES

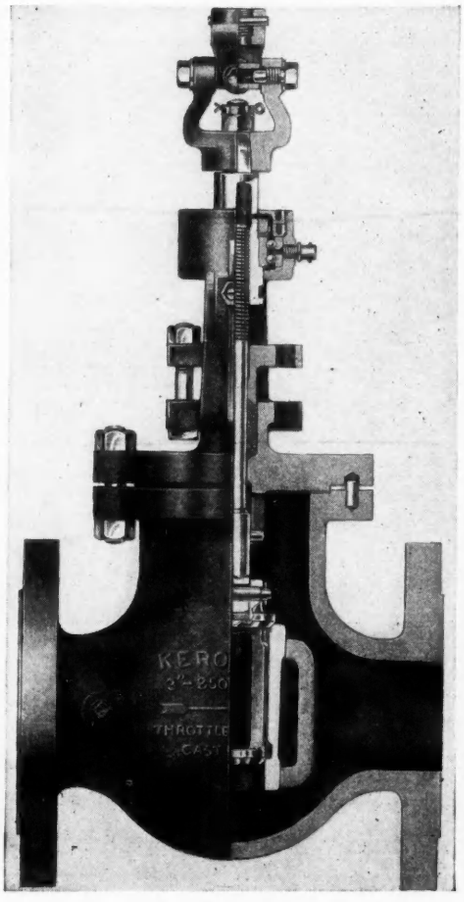
Save Enough Time to Pay for Their Cost On Every Hole!

The extraordinary service secured from Kerotest Balanced Throttle Valves over the past several years has proven their time saving merit in every rotary field in America and in many foreign lands. Every user is an enthusiastic booster.

Its easy operation eliminates the wrist-breaking labor so common on ordinary throttle valves. You can drill more continuously—you can go in and out of the hole faster and you can make more footage.

Moreover, the perfect shutoff and sensitive control enables a Kerotest Throttle Valve to pay for itself in time saved on every completed hole. And it works equally efficient on mud pumps as well as in super heated steam service on drilling engines.

Mud Pumps can be controlled perfectly from the derrick floor with Kerotest Throttle Valves. It saves time—simplifies operations—and is the most efficient control possible.



KEROTEST MANUFACTURING CO.
PITTSBURGH, PA.

PRODUCTION UP

Oklahoma and Kansas primarily responsible

UNITED STATES crude oil production during the past week, ended November 14, averaged 3,018,650 barrels daily, according to the regular estimates compiled by THE OIL WEEKLY. That was 49,100 barrels a day more than the output in the previous week and 148,350 barrels a day more than the Bureau of Mines recommendation.

The increase over the previous week's production occurred despite a further important decline in Texas, and reflected higher output in Oklahoma, Kansas, California and New Mexico. Louisiana showed a very slight change, a decrease of several hundred barrels.

Texas production for the week was fairly close to the Bureau of Mines recommendation, averaging 1,118,300 barrels daily, or 9000 barrels a day more than the federal allocation. In the previous week the Texas output had averaged 1,157,600 barrels a day.

Louisiana's decrease was to 233,975 barrels daily from 234,500 barrels a day the week before. The new rate was 35,375 barrels a day above the federal allocation.

Oklahoma output last week jumped to 587,325 barrels daily from 526,800 barrels, an increase of 60,525 barrels, and the new rate was 28,925 barrels above the state quota. However, Oklahoma normally cuts production back materially in the latter part of each month, to compensate for overproduction in the early part of the month.

Kansas production averaged 167,075 barrels daily, or 23,625 barrels a day more than in the previous week. The state was 12,575 barrels above its bureau allocation.

California showed a slight increase of 2500 barrels daily, in averaging 591,000 barrels a day last week. That was 41,400 barrels a day more than the Bureau of Mines allocation.

New Mexico last week averaged 83,700 barrels daily, or 1100 barrels a day more than in the previous week, and 8100 barrels a day more than the federal recommendation.

Comparison of Permits Granted for New Wells

STATE	Week Ending Nov. 14	Total this Mo.	Total this Year	Total this Date Last Year	1935 Year Total
Arkansas	4	5	88	55	70
California	16	38	927	855	925
Louisiana	20	41	1,022	746	846
Kansas	49	87	1,636	1,034	1,204
Michigan	14	37	666	659	749
Oklahoma	67	118	2,259	2,006	2,311
Texas	305	566	13,920	9,740	10,800
Total	475	892	20,518	15,095	16,964

United States Crude Oil Production

Estimates Compiled by The OIL WEEKLY

STATE OR DISTRICT	Bureau of Mines Recommendation (Daily in Nov.)	ACTUAL PRODUCTION: BARRELS DAILY FOR WEEK ENDING Nov. 14	Nov. 7
TEXAS—			
Texas Panhandle	.....	59,400	64,700
North Texas	.....	63,400	64,500
West Central Texas	.....	32,200	32,800
West Texas	.....	145,100	158,400
East Central Texas	.....	61,300	65,100
*East Texas Field	.....	441,500	440,600
South Texas	.....	162,600	167,300
Texas Gulf Coast	.....	152,800	164,200
*Total Texas	1,109,300	1,118,300	1,157,600
OKLAHOMA—			
Oklahoma City	.....	161,075	116,275
Seminole Area	.....	128,175	130,575
Tatums	.....	3,325	3,350
Lucien	.....	13,075	13,150
Fitts	.....	68,100	58,100
Edmond	.....	15,950	12,275
Others	.....	197,625	193,075
Total Oklahoma	558,400	587,325	526,800
KANSAS—			
Ritz-Canton	.....	5,900	5,750
Voshell	.....	2,825	2,800
Nikkel-Hollow	.....	3,850	3,600
Sedgwick	.....	4,675	4,925
Burrton-Haury	.....	13,600	13,475
Lorraine	.....	6,475	3,400
Oxford	.....	3,050	3,850
Others	.....	126,700	105,650
Total Kansas	154,500	167,075	143,450
LOUISIANA—			
North Louisiana	.....	77,175	76,400
Louisiana Gulf Coast	.....	156,800	158,100
Total Louisiana	198,600	233,975	234,500
ARKANSAS	28,100	27,775	28,300
CALIFORNIA			
Long Beach	.....	66,000	65,500
Santa Fe Springs	.....	45,500	45,000
Huntington Beach	.....	37,000	36,500
Dominguez	.....	24,500	25,000
Inglewood	.....	13,000	11,000
Ventura Avenue	.....	33,000	33,000
Seal Beach	.....	9,000	9,000
Midway-Sunset	.....	66,500	65,000
Elwood	.....	11,500	12,000
Kettleman Hills	.....	76,000	80,000
Mountain View	.....	21,500	21,500
Playa del Rey	.....	11,500	11,500
Others	.....	176,000	173,500
Total California	549,600	591,000	588,500
MOUNTAIN STATES			
Wyoming	40,100	45,100	40,200
Montana	14,300	16,800	15,600
Colorado	4,400	4,700	4,800
Total Rocky Mountain States	58,800	66,600	60,600
NEW MEXICO	75,600	83,700	82,600
EASTERN STATES	108,400	112,800	116,400
MICHIGAN	29,000	30,100	30,800
*Total United States	2,870,300	3,018,650	2,969,550
*Surreptitiously produced oil in East Texas, not included in above figures, estimated at	.....	10,000	10,000
Grand total including surreptitious production	.....	3,028,650	2,979,550

Crude Runs to Stills, Stocks of Finished and Unfinished Gasoline and Gas and Fuel Oil, and Cracked Gasoline Production, Week Ended November 7, 1936

(Figures in thousands of barrels of 42 gallons each)

DISTRICT	Daily Refining Capacity			Crude Runs to Stills		Stocks of Finished and Unfinished Gasoline				Stocks of Gas and Fuel Oil			Daily Charging Capacity of Cracking Units			Cracked Gasoline Production
						Finished										
	Potential Rate	Reporting		Daily Average	% Operated	At Refineries	Terms. Trans. Pipe Lines	Unfinished in Naphtha Distillates	Total Finished and Unfinished	Gas, Oil & Distillates	Residual Fuel Oil	Total	Potential Rate	Reporting		Daily Average
		Total	%											Total	%	
East Coast	612	612	100.0	538	87.9	4,826	8,994	820	14,640	6,802	6,032	12,834	534	534	100.0	109
Appalachian	154	146	94.8	79	54.1	824	1,057	282	2,163	355	295	650	79	78	98.7	20
Ind., Ill., Ky	475	457	96.2	423	92.6	4,489	3,324	690	8,503	3,275	3,144	6,419	349	348	99.7	134
Okla., Kans., Mo.	453	384	84.8	265	69.0	3,031	2,015	476	5,522	1,197	2,287	3,484	256	228	89.1	66
Inland Texas	330	160	48.5	113	70.6	1,237	69	193	1,499	435	1,340	1,775	148	105	70.9	29
Texas Gulf	732	710	97.0	585	82.4	5,078	265	1,719	7,062	4,786	3,728	8,514	399	393	98.5	137
Louisiana Gulf	169	163	96.4	131	80.4	957	344	174	1,475	1,212	1,183	2,395	77	74	96.1	28
North La.,—Ark.	80	72	90.0	57	79.2	199	55	49	303	157	251	408	46	44	95.7	9
Rocky Mountain	97	60	61.9	51	85.0	636	.....	92	728	205	514	719	46	39	84.8	13
California	852	789	92.6	445	56.4	8,465	2,098	1,258	11,821	.....	.....	73,451	280	280	100.0	69
Reported	.....	3,553	89.9	2,687	75.6	29,742	18,221	5,753	53,716	.....	.....	110,649	.....	2,123	95.9	614
Estimated Unreported	.....	401	....	233	....	2,159	1,026	408	3,593	.....	.....	2,275	.....	91	....	46
*Estimated Total U.S. November 7, 1936	3,954	3,954	....	2,920	....	31,901	19,247	6,161	57,309	.....	.....	112,924	2,214	2,214	....	660
*Estimated Total U.S. Oct. 31, 1936	3,954	3,954	....	3,040	....	†32,265	†19,499	†6,044	†57,808	.....	.....	†112,958	2,214	2,214	....	700
U. S. B. of M., *November 7, 1935	.....	....	....	‡2,773	....	27,458	17,364	5,501	50,323	.....	.....	109,694	.....	....	....	‡599

*Estimated Bureau of Mines basis. ‡November 1935 daily average. †Revised. Comparable with week November 7th but not prior weeks.

NEW INDICTMENT

Companies charged with fixing jobber margins

Madison, Wisconsin. — The new indictment returned here by the federal grand jury November 6 against a group of oil companies and executives embodies the charge that certain major companies operating in the Middle West made secret agreements fixing jobber margins.

Such alleged agreements represented one of the principal matters that the National Oil Marketers' Association complained of originally in an appeal to Attorney General Cummings in June, 1935. Following the association's complaint, an investigation was started, and the findings resulted in commencement of the Madison grand jury investigation May 4, 1936.

The recent indictment was the fourth returned. The first and third charged W. A. Tracey, of Sinclair Refining Company, with perjury in testimony. The second, returned July 28, charged a group of oil companies and executives of the Middle West with conspiring to fix and maintain gasoline prices through an alleged buying pool.

In addition to the charge of alleged fixing of jobber margins, the latest indictment embodies two other counts. The second count is based on alleged uniformity of jobber contracts. In the third count the defendants are charged with agreements and concerted action regarding adoption of certain policies toward the jobber.

When the Department of Justice announced from Washington that the indictment had been returned November 6, it pointed out, perhaps significantly, that the grand jury had not yet concluded its investigation.

305 TEXAS PERMITS

Austin, Texas.—The Texas Railroad Commission approved last week permits for drilling 305 new wells in Texas, 44 more than were allowed the week before.

Most of the increase was caused by the receipt of 88 new locations from North Texas operators.

Summary of Wells Completed in the United States Week Ending November 14, 1936

	Completions	Oil Wells	Gas Wells	Failures	Initial Production	Total Completions 1936	Total Completions this Date 1935
Alabama	....	....	....	....	.....	2	4
Arkansas	2	....	....	2	.....	81	114
California	20	18	....	2	8,215	993	758
Colorado	....	....	....	....	.....	14	10
Illinois	....	....	....	....	.....	4	9
Indiana	....	....	....	....	.....	160	170
Kansas	27	17	....	10	13,982	1,464	1,235
Kentucky	....	....	....	....	.....	238	154
Louisiana	12	10	....	2	10,958	896	633
Michigan	11	5	2	4	745	683	513
Mississippi	....	....	....	....	.....	6	18
Montana	5	3	....	2	187	164	151
Nebraska	1	....	....	1	.....	1	....
New Mexico	8	7	....	1	11,643	497	255
New York	....	....	....	....	.....	....	....
Ohio	62	33	18	11	864	1,699	1,283
Oklahoma	56	42	2	12	59,166	2,531	2,116
Pennsylvania	....	....	....	....	.....	....	113
Texas	217	170	5	42	266,859	10,986	10,394
Utah	....	....	....	....	.....	....	1
West Virginia	....	....	....	....	.....	548	442
Wyoming	3	3	....	....	606	76	64
Florida	....	....	....	....	.....	1	....
Total this week	424	308	27	89	373,225	21,044	18,458
Total last week	475	322	32	121	415,210	....	....
Total this year	21,044	14,149	1,968	4,927	19,748,914	....	....

CRUDE OIL PRICE QUOTATIONS

(Figures Represent Basic or Flat Prices—Revised to November 13, 1936)

DISTRICT	Bottom Grav.	Dif.	Top Grav.	Date
Oklahoma-Kansas	28—$0.94	2¢	40—$1.18	1- 9-36
N. and N.-C. Texas	28— .84	2¢	40— 1.08	1- 9-36
Texas Panhandle				
Gray County	34— .86	2¢	40— .98	1- 9-36
Carson-Hutchinson	34— .81	2¢	40— .93	1- 9-36
West Texas				
Andrews, Crane, Crockett, Ector, Glasscock, Howard, Winkler, Upton	29— .76	2¢	36— .90	1-14-36
West Central Texas	28— .84	2¢	40— 1.08	1- 9-36
East Central Texas	28— .91	2¢	40— 1.15	1- 9-36
East Texas	*1.15			1- 9-36
Talco	* .65			11-1-36
Rodessa	*1.10			1- 9-36
Texas Gulf Coast				
Anahuac - Dickinson, Flour Bluff, Turtle Bay	30— 1.04	2¢	40— 1.24	1- 9-36
Conroe	35— 1.24	2¢	40— 1.34	1- 9-36
Tomball, Satsuma	*1.30			1- 9-36
Cleveland	*1.00			1-11-34
†Goose Creek, Hull, Liberty, Orange, Pierce Junction, Barbers Hill, Raccoon Bend, Sugarland, West Columbia, Thompsons, Mykawa, Amelia, Plymouth, Quintana-O'Connor, North Quintana	Below 17— .88	2¢	34— 1.22	1- 9-36
South and S. W. Texas	Below			
Refugio (Light)	17— .88	2¢	34— 1.22	1- 9-36
Refugio (Heavy)	* .95			11- 1-36
Greta (Heavy)	* .95			11- 1-36
Saxet (Light)	*1.22			10- 1-36
Saxet (Heavy)	* .95			11- 1-36
Taft (Heavy)	* .95			11- 1-36
Mirando	* .90			11- 1-36
Pettus	*1.25			1- 9-36
Salt Flat	* .97			1-14-36
Darst Creek	* .97			1-14-36
Placedo (Heavy)	* .90			11- 1-36
Placedo (Light)	* .95			4- -36
Port Lavaca	* .97			
Heyser (Light)	*1.15			11-1-36
Heyser (Heavy)	* .90			11-1-36

* All gravities—flat rate.
† Gulf Coast prices as posted by Humble Oil & Refining Company.

DISTRICT	Bottom Grav.	Dif.	Top Grav.	Date
Arkansas				
El Dorado (Light) and Rainbow	25—$0.78	2¢	40—$1.10	1-10-36
El Dorado East Field and Smackover	* .75			1-10-36
North Louisiana	25— .78	2¢	40— 1.10	1-10-36
Urania	* .97			1-10-36
South Louisiana	Below			
Lockport	19— .92	2¢	34— 1.22	1- 9-36
Iowa Cameron Mds.	19— .82	2¢	34— 1.12	1- 9-36
Lafitte	*1.12			11- 1-36
Rocky Mountain States				
Salt Creek	29— .94	2¢	40— 1.18	1-10-36
Elk Basin	*1.18			7-20-36
Frannie (Light)	* .70			11- 4-36
Frannie (Heavy)	* .62			11- 4-36
Grass Crk., Wyo., (Light)	*1.18			7-20-36
Grass Creek (Heavy)	* .62			11- 4-36
Hamilton Dome	* .57			11- 4-36
Big Muddy	*1.11			1- 9-36
Rock Creek, Wyo.	*1.08½			11- 1-36
Sunburst	*1.15			6- 5-36
Lance Creek	* .90			1- 9-36
Osage	*1.08			
Cat Creek	*1.07			8-25-33
Cut Bank	*1.35			6- 3-36
Pondera	*1.05			9-29-33
Hog Back, N. M.	*1.00			9- 8-33
Lea County, N. M.	29— .76	2¢		1-14-36
Mid-West States				
Lima	*1.15			9-18-36
Illinois	*1.23			1- 9-36
Princeton	*1.23			1- 9-36
Western Kentucky	*1.28			11-1-36
Pennsylvania				
Bradford	*2.45			1-13-36
Sw. Pa. Pipe Line	*2.17			1-13-36
Eureka Pipe Line	*2.12			1-13-36
Buckeye Pipe Line	*1.97			1-13-36
Corning Grade	*1.32			9-18-36
Michigan				
Central Michigan	‡1.32			9-16-36
Muskegon	*.70–1.00			12-31-32
Canada				
Petrolia	*2.10			9- 9-33
Oil Springs	*2.17			9- 9-33
Mexico				
F.O.B. Tampico	‡0.895			

* All gravities—flat rate.
‡ Average price, all oil sales being to small refineries.
‡ U. S. Currency, buyer pays tax.

MAJOR PRICE CHANGES

	Penna. (Nat. Tr.)	Mid.-Cont. (36 Gr.)	Calif. (26 Gr.)
June 19, 1933	Up 10	Up 19	.....
June 26, 1933	Up 10	.....	Up 9-12
July 6, 1933	Up 13	Up 10	.....
July 17, 1933	Up 15	.....	.....
July 28, 1933	Up 15	.....	.....
August 11, 1933	Up 10	.....	.....
August 24, 1933	.....	Up 10	.....
August 30, 1933	Up 15	.....	.....
September 6, 1933	Up 10	Up 10	Up 15
September 8, 1933	.....	Up 15	.....
May 1, 1934	Up 10	.....	.....
November 6, 1934	Cut 25	.....	.....
December 6, 1934	Cut 25	.....	.....
January 4, 1935	Up 15	.....	.....
February 4, 1935	Up 15	.....	.....
May 16, 1935	Cut 15	.....	.....
June 26, 1935	Cut 15	.....	.....
July 16, 1935	Cut 10	.....	.....
August 29, 1935	.....	.....	Cut *4
September 6, 1935	Up 5	.....	.....
October 29, 1935	Up 15	.....	.....
November 1, 1935	.....	.....	Up *28
November 18, 1935	Up 15	.....	.....
December 6, 1935	.....	.....	Up *9
January 9, 1936	.....	Up 10	.....
January 13, 1936	Up 15	.....	.....
February 26, 1936	.....	.....	Up ⁋5

CRUDE PRODUCTION TAXES

Oklahoma—Five percent of gross value less royalty interest.

TEXAS—2¾ cents or 2¾ percent, whichever is higher.

Louisiana—From four to 11 cents a barrel, depending upon gravity.

Arkansas—2.6 percent of gross market values.

Montana—Two percent of gross value at well and ⅜ of 1c per barrel.

Wyoming and New Mexico—Production tax based upon state and county assessments.

California—.66443 mills per barrel of oil produced and 17.39 cents per acre on proved oil lands.

* All gravities—flat rate.
+ Signal Hill 26 gravity.
⁋ Seal Beach 26 gravity.

CALIFORNIA OIL PRICES

(All gravities above those quoted take highest prices of that field. Effective February 26, 1936)

Gravity	Signal Hill	Seal Beach Alamitos Heights	Huntington Beach	Inglewood	Playa Del Rey	Olinda Brea Canyon	Athens Rosecrans	Elwood Terrace	Torrance	Richfield	Whittier East Coyote La Habra	Montebello	West Coyote Hills	Santa Fe Springs	New Hall McKittrick Kern River Round Mountain	Mountain View	Midway-Sunset Buena Vista Hills Elk Hills	Lost Hills	Coalinga	Wheeler Ridge
14-14.9	$.80	$.79	$.78	$.79	$.80	$.76	....	....	$.80	$.76	$.76	$.77	$.78	.....	$.70	....	$.70	$.70	$.70	....
15-15.9	.80	.79	.78	.79	.80	.76	....	....	.80	.76	.76	.77	.78	.....	.70	....	.70	.70	.70	....
16-16.9	.80	.79	.78	.79	.80	.76	....	....	.80	.76	.76	.77	.78	.....	.70	....	.70	.70	.70	....
17-17.9	.80	.79	.78	.81	.80	.76	....	....	.80	.76	.76	.77	.78	.....	.70	....	.70	.70	.70	....
18-18.9	.80	.79	.78	.84	.80	.78	....	....	.82	.76	.76	.77	.78	.....	.70	....	.70	.70	.70	....
19-19.9	.82	.79	.82	.87	.84	.81	....	....	.85	.76	.78	.77	.78	.....	.70	$.70	.74	.74	.71	$.70
20-20.9	.85	.79	.85	.90	.88	.84	....	....	.88	.78	.82	.77	.80	.....	....	.70	.78	.78	.72	.70
21-21.9	.88	.79	.89	.93	.93	.88	....	....	.91	.80	.85	.77	.84	$.78	.....	.73	.82	.82	.74	.70
22-22.9	.92	.82	.92	.96	.98	.92	....	....	.93	.84	.89	.79	.88	.78	.....	.77	.87	.86	.78	.72
23-23.9	.95	.86	.96	.99	1.02	.96	$.84	....	.96	.88	.93	.82	.92	.78	.....	.80	.92	.90	.82	.76
24-24.9	.99	.91	1.00	1.02	1.06	.99	.88	....	.99	.91	.96	.85	.96	.82	.....	.84	.97	.94	.86	.79
25-25.9	1.03	.95	1.03	1.05	1.11	1.03	.93	....	1.02	.95	....	.89	.99	.86	.....	.88	1.01	.98	.90	.83
26-26.9	1.06	1.00	1.07	1.09	1.16	1.06	.98	....	1.05	.98	....	.92	1.03	.90	.....	.91	1.06	1.02	....	....
27-27.9	1.10	1.05	1.11	1.12	....	1.10	1.03	....	....	1.02	....	.96	1.06	.95	.....	.95	1.10	1.06	....	....
28-28.9	1.14	1.10	1.14	1.15	....	1.14	1.07	....	....	1.06	....	.99	1.10	.99	.....	.99	1.15	1.10	....	....
29-29.9	1.17	1.15	1.18	1.18	F.O.B.	1.17	1.13	.....	.....	1.09	.....	1.03	1.14	1.03	.....	1.02	1.20	1.14	....	....
30-30.9	1.21	1.19	1.22	1.21	Pipe	1.21	1.17	F.O.B.	.....	.....	.....	1.07	1.17	1.08	.....	1.06	1.25	1.18	....	....
31-31.9	....	.....	....	1.24	Line	1.24	1.22	Ship	Kettleman Hills			1.11	1.21	1.12	.....	1.09	1.29	....	....	....
32-32.9	....	....	....	1.27	....	1.27	1.27	.....				1.14	1.25	1.16	.....	1.13	1.34	....	....	....
33-33.9	....	....	....	....	....	....	1.32	$.128		1.19		1.18	1.28	1.20	.....	1.17	1.38	....	....	....
34-34.9	....	....	....	....	....	....	1.37	1.32	....	1.23	....	1.22	1.32	1.25	.....	1.20	.....	....	....	....
35-35.9	....	....	....	....	....	....	1.42	1.35	....	1.27	....	1.25	....	1.29	.....	....	.....	....	....	....
36-36.9	....	....	....	....	....	....	1.46	1.39	....	1.31	....	1.29	....	1.33	.....	....	.....	....	....	....
37-37.9	....	....	....	....	....	....	1.51	1.43	....	1.35	....	1.32	....	1.37	.....	....	.....	....	....	....
38-38.9	....	....	....	....	....	....	1.56	....	....	1.39	....	1.36	....	1.42	.....	....	.....	....	....	....
39-39.9	....	....	....	....	....	....	1.61	....	....	1.43	....	1.40	....	.....	.....	....	.....	....	....	....
40-40.9	....	....	....	....	....	....	1.66	....	....	....	....	1.43	....	.....	.....	....	.....	....	....	....

WORLD DEVELOPMENTS and TECHNOLOGY

Edited by
WM. V. GROSS, Associate Editor

Future Clouded

ARGENTINA'S MONOPOLISTIC TREND BOTHERS COMPANIES

Nationalization and the trend toward government control of industry in Argentina seem to cloud with doubt the future of private enterprise in that country. Other industries have felt and are feeling the curbing effects of these trends. The oil industry, exclusive of the government controlled Yacimientos Petroliferos Fiscales, is feeling the effects.

Private corporations engaged in marketing petroleum products are still rocking from the blow delivered when the government took steps to assure Yacimientos Petroliferos Fiscales direct control of distribution of 50 per cent of petroleum products throughout the country. This will represent a substantial gain on the part of the government company that can only be accomplished at the expense of the private oil companies.

Yacimientos Petroliferos Fiscales has told private marketing concerns that: (a) No new filling stations may be constructed without sanction of the governing board. (b) Companies are prohibited from naming new agents. (c) If expansion is planned, details must first be submitted to the governing board for consideration.

These rules, plus the fact that the Yacimientos Petroliferos Fiscales has already been given jurisdiction over regulation of imports, show a definite trend toward monopoly and may explain the state of chaos said to hold sway among private oil companies in Argentina today.

Government Production Up

Yacimientos Petroliferos Fiscales does not have sufficient production in Argentina to manufacture enough petroleum products to take care of 50 per cent of the domestic market. It imports, and will have to continue to import for some time, both crude and refined products for domestic refining and domestic consumption.

But the trend toward greater "national" production is increasing. The trend toward greater production by private companies is not so pronounced. In the first 6 months of 1935 Argentina produced 1,116,746 cubic meters of crude; in the first 6 months of this year crude oil production was 1,206,832 cubic meters. Yacimientos Petroliferos Fiscales produced 463,146 cubic meters in the first half of 1935 as against 541,325 cubic meters in the first half of 1936. Private corporations produced 653,600 cubic meters in the first half of 1935 as against 665,503 cubic meters in the first half of this year.

In the 4 main producing fields of the republic, Y.P.F.'s share of production in the first half of 1936 was as follows (figures in cubic meters): Comodoro Rivadavia, 484,818; Plaza Huincul, 37,336; Salta Province, 15,856; Mendoza, 3,319. Production by private companies during the same period was: Comodoro Rivadavia, 492,789; Plaza Huincul, 42,528; Salta Province, 129,243; Mendoza Province, 943.

What the future of Argentina's rank among producing nations will be can only be determined by a far greater exploratory drilling campaign than has ever been carried on in the country. Under the present drift toward government monopoly it is not felt private capital will be interested in investing too much money in exploratory work, and government exploratory drilling has not thus far been able to contribute enough in the way of new crude reserves to keep pace with the increasing domestic demand. Early in November word was received by THE OIL WEEKLY that prospecting was being carried on in the Provinces of Mendoza and Cordoba, but that no areas of great promise had been discovered.

Situation on Imports

Argentina's imports of crude petroleum for domestic refining consistently increased during the first 6 months of 1936, notwithstanding the fact that May and June are considered winter months there. Students of the industry think this trend will continue until Y.P.F. approaches a refinery production somewhere near 50 percent of domestic demand for petroleum products. On the other hand, imports of gasoline, kerosene, lubricating oils and greases have been definitely decreasing as a result of greater local refining activity.

The country imported over 15 million pounds of lubricating oils in the first half of 1935. During the first half of this year imports of the product dropped to less than 11 million pounds. Kerosene imports, which amounted to more than 200,000 gallons the first half of 1935, dropped to 484 gallons in the first half of this year. Gasoline imports, which amounted to 790,871 gallons in the first half of 1935, declined to 208,505 gallons in the first half of 1936. Grease imports were not half as great in the first 6 months of 1936 as the 428,034 pounds imported the first half of last year. Diesel oil, too, was down from 146,760 tons to 135,589 tons, but demand for this product is said to be rapidly growing in Argentina.

Indicative of the increase, fuel oil imports jumped from 273,356 tons the first half of 1935 to 357,143 tons during the corresponding period of this year, and crude oil imports increased from 206,468 tons in the first half of last year to 234,873 tons in the first half of 1936.

JAPAN DEEP TEST

Nippon Oil's Kinsui 32 headed for 10,000 feet

Nippon Oil Company's Kinsui 32, deepest test in Japan, has just passed the 9000-foot mark and will be drilled ahead to at least 10,000 feet, pressure conditions permitting, according to a communication received November 9 from K. Uyeno, Byoritsu, Taiwan, general manager.

"We are drilling in very hard shale, making only 8 or 10 feet of progress per day," Uyeno says, and then infers he will prepare an article for publication in THE OIL WEEKLY later describing Nippon Oil Company's fight against pressure in Kinsui field is said fight is effective enough to allow them to reach the 10,000-foot goal.

ROYALTY IN OIL?

Search for oil near King Edward's ranch

Possibility of the ranch owned by King Edward VIII, near High River, Alberta, being proven as an oil field is enhanced as two wells, Pekisko and Canadian Maple Leaf Royalties tests, drilled ahead.

The Pekisko well is in Banff shales under Dolomitic limestone and above Devonian limestone. Officials of the Pekisko Company hope to strike production at the Devonian lime contact.

King Edward holds a 99-year oil and gas lease on the ranch, which is located south of the Maple Leaf and Pekisko wells. If a strike were made on either Pekisko or Maple Leaf, His Majesty might be approached with requests to permit drilling operations on his land. If the royal consent were given, royalties would go to the British Crown in the event of production being obtained.

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Fundamental Research

[*Continued from page 10*]

physical-chemical processes, such as destructive distillation, rather than by bacterial action. Objecting to this theory because of its assumption that fatty materials are little subject to bacterial destruction, he declared that while it was theoretically possible, the destructive-distillation process of nature requires ages; organic decay usually occupies only a few months.

He reported that the possibilities of acid and alkaline digestion, and of actalytic action by ordinary soil constituents, offer possible alternatives for complete biogenesis, adding that in some cases where faulting and folding are in evidence, the formation of petroleum from oil shales by destructive distillation itself seems not out of the question.

Thayer cited experiments that have revealed strains of aerobic bacteria isolated from sea water and diatom cultures are capable of attacking fats, particularly in marine sedimentary environments. He suggested that marine sediments examined as possible source of petroleum retain a considerable portion of their organic matter in a form which will yield oil upon distillation, but which is not petroleum until distilled either under the influence of diastrophism, or by artificial treatment.

Three papers were presented at the Division of Production group session Thursday morning, with J. T. Hayward, Barnsdall Oil Company, Tulsa, as the presiding officer.

Derrick Structure Study

S. B. Settle, Parkersburg Rig & Reel Company, discussed "Investigation of Angle Columns as Used for Derrick Legs." His paper is presented elsewhere in this issue in full. He showed there is a discrepancy in the existing A. P. I. derrick column formulas and pointed out the need for further investigation for the purpose of evolving a more correct method of rating derricks so that their safe load capacities will be commensurate with the strength of the leg section.

Higher compression yield strength in the transverse direction means increased collapse resistance and setting depth of casing, and higher tension yield strength in the longitudinal direction, coupled with this higher compression yield strength, means increased "pull out" strength of threaded and coupled casing, stated T. McLean, Jasper. His subject was "Importance of Compression Yield Strength in Establishing Setting Depths for Casing."

The increasing attention being given to the scientific study of the relation these properties bear to correct production practices shows the need for equipment designed to procure representative samples of reservoir fluids and to examine them in detail under suitably controlled conditions, asserted Paul G. Exline, Gulf Research and Development Company. His paper was in the nature of a progress report describing the present status of equipment designed for this purpose. He explained that efforts were made to construct apparatus that could be used in the field in order to eliminate time lost in sending the sample to the laboratory. Although this has been done without sacrificing reliability of the results, and with a great reduction in the time between sampling and reporting the date, he continued, there has been some loss in flexibility of the equipment.

Pressure in Well Important

The final group session held by the Division of Production took place Thursday afternoon, and T. V. Moore, Humble Oil & Refining Company, Houston, was the presiding officer. The program included four production papers.

A study of methods of keeping oil wells flowing and thereby reducing production costs was told by Emory Kemler of Tulsa, and G. A. Poole, of Odessa, Texas, both affiliated with Gulf Oil Corporation. They reported their studies have disclosed that gas-oil ratio has a greater effect on maintaining pressure in the well tubing than tubing size or rate of flow. Pressure drop in tubing, they said, is a combination of the effect due to friction and the difference in pressure due to fluid head. The difference in pressure is due mostly to the actual pressure head, they explained, and consequently the gas-oil ratio exerts an important effect through the aeration of the column and changes in static head. They expressed the opinion that the effect of tubing size generally tends to cancel out, for as pipe size increases friction decreases, but there is more slippage.

Efforts to calculate petroleum reserves by volumetric methods were described by Howard C. Pyle, Los Angeles, and P. H. Jones, Wilmington, California, both on the staff of Union Oil Company of California. They said the first essential was knowledge of the space volume of the reservoir sands available to oil and gas, and that they had attempted to make quantitative determinations of formational connate water by examining cores. By employing tracer materials, they said they had found that an average of 32 percent of the effective pore space of the oil sands is occupied by connate water.

Several methods for determining porosity were described by Kenneth B. Barnes, Gulf Oil Corporation, Tulsa. He spoke briefly on the application of porosity, saturation and permeability tests of cores to old and new fields. In describing various methods of laboratory analysis, Barnes identified the retort method as the preferred procedure for making saturation tests.

Group Elects 20 Members

At the division's group session Thursday morning 20 elective members of the general committee were elected, and five additional members of this committee were appointed by the Institute President, Axtell J. Byles.

Members re-elected included the following: A. M. Blow, Amerada Petroleum Corporation, Tulsa; C. Bunje, Jr., Illinois Pipe Line Company, Findlay, Ohio; R. E. Collom, Continental Oil Company, Los Angeles; C. P. Dimit, Phillips Petroleum Company, Bartlesville, Oklahoma; R. B. Kelly, Pure Oil Company, Fort Worth; C. H. Lieb, Carter Oil Company, Tulsa; M. E. Lombardi, Standard Oil Company (California), San Francisco; W. L. McLaine, General Petroleum Corporation of California, Los Angeles; W. M. O'Connor, Atlantic Refining Company, Philadelphia; R. B. Pringle, Tide Water Oil Company, Tulsa; F. L. Prior, Stanolind Oil & Gas Company, Tulsa; J. H. Russell, Gulf Oil Corporation, Houston; D. R. Snow, Barnsdall Oil Company, Tulsa; and T. E. Swigart, Shell Petroleum Company, Houston.

New members elected to complete the 20 elective members of the committee were as follows: Blain B. Wescott, Gulf Research and Development Company, Pittsburgh, Pennsylvania; A. C. Rubel, Union Oil Company of California, Los Angeles; W. L. Connelly, Sinclair Prairie Oil Company, Tulsa; John R. Suman, Humble Oil & Refining Company, Houston; Bert E. Hull, The Texas Pipe Line Company, Houston; and A. W. Ambrose, Empire Companies, Bartlesville.

The five members appointed by Byles were: J. Edgar Pew, Sun Oil Company, Philadelphia; O. D. Donnell, Ohio Oil Company, Findlay, Ohio; E. L. Smith, E. L. Smith Oil Company, Mexia, Texas; Ralph B. Lloyd, Lloyd Corporation, Limited, Los Angeles; and C. H. Kountz, Sinclair Refining Company, Independence, Kansas.

Progress Is Made

[*Continued from page 12*]

tional forms, all types of drilling could be covered. A special committee will attempt to draw up a number of standard drilling contract forms during the next few days, with Brantly as chairman.

A feature of the informal meeting of the Sub-committee on Rating of Pumping Machines was the emphasis placed on the importance of proper lubrication. During the discussion it was inferred that many operators neglect to watch this phase of pumping operations. The character and quantity of lubricants were listed as important factors in the successful operation of pumping gears.

Shaft Breakage

A. C. Rubel, Union Oil Company of California, stated that his company had made a study of well loads, and of the performance of pumping equipment under extreme conditions. More trouble had been experienced in shaft breakage than in gear breakage, he said. It was found that use of double crank gave good results under heavy loads. His company had found it difficult to determine well loads, due to heading action, shock and other important factors.

The operator said that gear manufacturers should familiarize themselves with oil well loads before offering gears to the petroleum industry. He added that many gears offered were inadequate for the peak loads often imposed during heavy pumping operations. He said it had been impossible to make the so-called or tentative A. P. I. ratings apply to all conditions.

One member said that some manufacturers had taken advantage of tentative A. P. I. specifications and recommendations while selling their gears. There was some sentiment toward eliminating horsepower rating in favor of torque rating. It was brought out that there are two methods of determining the load on the gears. One is by calculat-

ing the load on the polish rod and following back to the gears. The other considers the power delivered by the prime mover and determines the load reaching the gears.

The operator stated that well loads fluctuated sharply during 24 hours, and that power requirements were far from uniform. With such an erratic well it was pointed out that a 40-horsepower engine might deliver only 20 strokes per minute during part of the day, only to deliver 26 strokes per minute during another interval. This condition in a number of wells apparently was caused by a change in the fluid level. Surface conditions were checked, and there was no reason for a fluctuation in prime mover operation.

A hydraulic dynamometer is used to some extent in California for weighing wells, but other methods are used as a check as well as for basic operations. The weighing of wells requires a close study of data sheets and fairly accurate interpretations before conclusions can be drawn, a member pointed out during the open discussion. It was shown that any weighing method might be applied if the engineer was able to interpret the data obtained during field operations.

The chairman, H. N. Marsh, General Petroleum Corporation, said that the dynamometer and bottom hole pressure reading should be used together in formulating an operating plan for pumping wells.

The Engineers' Sub-Committee on Tanks met Tuesday morning and considered a number of construction problems. W. M. Giffen presided.

Valves and Fittings

At a meeting of the Special Sub-Committee on the Standardization of Valves and Fittings, several recommendations were discussed. It was disclosed that the Institute's Refinery Standardization Committee is now formulating a standard for refinery valves that will be similar to the standards on pipe line valves. This proposed specification is being considered by the Refinery Standardization Committee at this time.

Following the outline of the proposed standards on production valves, as prepared by the Group 2 Sub-Committee of Standardization of Production Valves and presented at the May, 1926, meeting, Stanley Durward told of progress made at a meeting Monday.

During the discussion on ring joints, it was stated that the Institute's proposed specifications, prepared by the Special Sub-Committee on Standardization of Valves and Fittings, had been reviewed in proof form by members of the committee, after incorporating changes adopted at the Tulsa meeting. When considering the standards on production valves, a suggestion that an attempt be made to simplify the ring joint standards by adopting uniform pitch of rings for all classes of service, and to reduce the number of sizes of rings, was considered.

Concerning threading practice and gauging of threads in flanges and fittings, it was shown that a previous suggestion had been made that the thread in flanges shall in all cases extend through to the face of the flange, even though this may require a thread length longer than the minimum described.

The committee has been considering a recommendation that the pitch diameter of the 10-inch nominal size for the 300-, 400-, 600- and 900-pound flanges be changed from 12½ to 12¾ inches to agree with present practice. This would make this pitch diameter the same as the 1500-pound class, although the 1500-pound class has a slightly wider ring than the other classes. The suggestion that the pitch diameter of the 900-pound, 14-inch nominal size be changed from 16¼ inches to 16½ inches to agree with the 1500-pound class was considered.

Several changes in pitch diameters were discussed. Mr. Houser previously had proposed to change the depth of grooves slightly where practicable so that the metal added to the face of the flanges will be exactly 1/16 inch.

The Central Committee on the Standardization of Oil Field Equipment met at a dinner session early Tuesday evening. J. Edgar Pew was chairman and C. A. Young secretary.

A joint meeting of the Engineering Sub-Committees 5-A-1 and 5-A-2 on Tubular Goods was held Wednesday morning, with C. W. Froome as chairman. This was one of the best attended meetings yet held and lengthy discussions drew comments from both manufacturers and operators.

The elements of tolerance and error in manufacturing casing, drill pipe and tubing were considered and several definite recommendations made. One manufacturer said that in a series of tests the couplings were made perfect and all element of error thrown against the pipe, while in other tests the tolerance was divided.

Taper tolerance was discussed at length, and the chairman stated that exhaustive tests had shown a wide variation in tapers. Recommendations previously had been made by the committee that the taper tolerance should be held between .060 and .065 for the three-fourths type, .029 to .034 for the three-eighths, and .013 to .018 for the three-sixteenths.

It was stated by one member that variation and taper seemed to have had less effect on leakage than mismatched tapers. Some manufacturers have the taper slightly steeper on the pipe than on the coupling to insure a tighter joint under extreme conditions.

The chairman pointed out that the taper on drill pipe ordinarily is more uniform and accurate than on casing. A manufacturer's representative stated that this was perhaps caused by the better support offered by the heavier upset drill pipe ends during threading operations. The thinner walls of the casing and tubing apparently permits going out of round during the strain imposed. It was shown that upset tubing often carried a more uniform thread than the conventional type.

During the discussion one committee member stated that it had been very difficult to determine the cause of leaks in casing and tubing. Drill pipe manufacturers have given the petroleum industry an improved product, and it may be possible to make comparable progress in the manufacture of casing and tubing, it was claimed.

Field tests have shown that a high precentage of new pipe threads were well beyond the A.P.I. limits of tolerance. This means that the manufacturers would have a long way to go in meeting more stringent taper requirements, it was disclosed.

Stanley Durward said that casing might pass satisfactory tests on the surface, only to show leaks when run in a crooked hole or placed under heavy strain. He added that the weight imposed and slight shift in the position of the pipe might easily lead to trouble after running into the hole.

The committee reported that it was not satisfied with the present hydrostatic tests. It was recommended that a recording gauge be installed. It was disclosed that on many occasions where pipe met the hydrostatic test satisfactorily at the mill, it had leaked at the coupling when put into actual service. The committee had previously stated that the five seconds test period was too short a time to develop leaks in the threads.

One member stated that he believed the casing coupling tolerance too lenient. The committee recommended that the tolerance be not more than one percent and should be held to one-eighth of an inch in any size pipe.

One recommendation was that when pipe is specifically ordered for welding the inside diameter tolerance should be held to one percent of the nominal outside diameter. The maximum outside diameter tolerance has for some time been plus or minus one percent, and it has become necessary under some conditions to establish a limitation on the variation of the inside diameter of the pipe.

Some of the manufacturers' representatives present indicated that the impact test has some value, but opinions differed as to the best impact measure to be used.

It was the consensus of opinion that the round thread normally has a number of advantages over the sharp thread. The engineering committee asked the manufacturers to make a study of the relative merits of both threads.

Manufacturers stated that they would meet the oil operators on a common ground and work out various pipe problems. The chairman stated that it would be unwise to impose tolerances that could not be reasonably met by the manufacturers.

The tolerance of one percent in the outside diameter of couplings was considered too large, especially in the larger sizes of casing when the coupling is the maximum oversize permitted.

The Central Committee on Pipe-Line Transportation met Wednesday morning, with C. H. Kountz as chairman and Carl Young as secretary. Another meeting Wednesday morning was the regular session of the Central Committee on Automotive Transportation. Leo Huff presided. The Committee on Uniform Methods of Oil Accounting met Wednesday morning, with F. S. Reitzel as chairman. The Central Committee on District Activities met at luncheon Wednesday. W. H. Meier presided. M. E. Brock was chairman at a meeting Wednesday afternoon of the Committee on Nomination, Division of Production.

Committee meetings Thursday included those of the Advisory Committee on Fundamental Research on Occurrence of Petroleum, E. G. Gaylord, chairman; Committee on Corrosion of Pipe Lines, C. R. Weidner, chairman; Program Committee of the Central Committee on Drilling and Production

Practice, B. B. Wescott, chairman; Correlating Committee of the Central Committee on Measuring, Sampling and Testing Crude Oil, W. R. Trelford, chairman; and Central Committee on Drilling Practice, T. V. Moore, chairman.

Axtell Byles Re-elected

[*Continued from page 9*]

and additional members were elected, 3 new members were elected to succeed directors whose terms expired this year, and other expiring terms were filled by re-election. One member was elected to fill the vacancy created by the death of P. M. Miskell.

The following directors were re-elected by the board itself: T. H. Barton, Lion Oil & Refining Company, El Dorado, Ark.; Amos L. Beaty, New York; E. R. Brown, Magnolia Petroleum Company, Dallas, Texas; J. A. Brown, Socony-Vacuum Oil Company, New York; W. S. Farish, Standard Oil Company of New Jersey, New York; H. R. Gallagher, Consolidated Oil Corporation, New York; B. F. Harris, National Tube Company, Pittsburgh; George A. Hill, Jr., Houston Oil Company of Texas, Houston; H. L. Hunt, H. L. Hunt, Inc., Tyler, Texas; R. B. Lloyd of Lloyd Corporation, Ltd., Los Angeles; J. M. Lovejoy, Seaboard Oil Company of Delaware, New York; R. G. A. van der Woude, Shell Union Oil Corporation, New York; and R. L. Wheelock, Wheelock & Collins, Corsicana, Texas.

H. Wilkinson, Asiatic Petroleum Corporation, New York, was elected to fill the vacancy created by the resignation of J. C. Van Eck, Shell Union Oil Corporation, New York. H. R. Straight, Empire Oil & Refining Company, Tulsa, was elected to fill the vacancy caused by the death of P. M. Miskell.

The board acted on recommendations of the Board of Councillors so to amend the by-laws as to permit the addition of three directors to the Central U. S. Production group, five members to the at-large group, and one member to the supply group. These new directors elected by the membership at the General Session this afternoon follow:

Ralph Pryor, of Slick, Pryor & Lockhart, Wichita, Kansas; Amon G. Carter, Fort Worth Star-Telegram, Fort Worth, Texas; E. H. Moore, independent producer, Tulsa; W. M. Patterson, Frick-Reid Supply Company, Pittsburgh.

The members re-elected all directors whose terms expired, with the exception of A. A. Moody, Jarecki Manufacturing Company, St. Louis, who was succeeded by W. J. Morris, Continental Supply Company, Dallas, Texas; and William Moeller, Jr., of Southern California Gas Company, Los Angeles, who was succeeded by J. D. Creveling, Panhandle Eastern Pipe Line Company, New York.

Directors for the enlarged at-large group, elected by the board itself, were Harry Frueauff, Cities Service Company, New York; Earl Webb, Ethyl Gasoline Corporation, New York; N. C. McGowen, United Gas Public Service Company, Houston; P. H. Curry, South Penn Oil Company, Pittsburgh; and I. A. O'Shaughnessy, Globe Oil & Refining Company, Minneapolis, Minnesota.

Directors re-elected by the membership were: W. H. Berg, Standard Oil Company of California, San Francisco; C. M. Boggs, Kamotex Refining Company, Arkansas City, Kansas; R. A. Broomfield, Barnsdall Oil Company of California, Los Angeles; E. J. Bullock, Standard Oil Company (Indiana), Chicago; H. M. Dawes, The Pure Oil Company, Chicago; Jacob France, Mid-Continent Petroleum Corporation, Tulsa; Wirt Franklin, Wirt Franklin Petroleum Corporation, Oklahoma City, Okla.; S. A. Guiberson, Jr., Guiberson Oil Company, Dallas, Texas; W. V. Hartmann, Gulf Refining Company, Pittsburgh; Wm. F. Humphrey, Associated Oil Company, San Francisco; Roy B. Jones, Panhandle Producing & Refining Company, Wichita Falls, Texas; K. R. Kingsbury, Standard Oil Company of California, San Francisco; C. H. Kountz, Sinclair Prairie Pipe Line Company, Independence, Kansas; E. A. Landreth, Landreth Production Corporation, Fort Worth, Texas; H. A. Logan, United Refining Company, Warren, Pa.; L. L. Marcell, Socony Vacuum Oil Company, Kansas City; D. J. Moran, Continental Oil Company, New York; C. E. O'msted, The Texas Company, Los Angeles; J. Howard Pew, Sun Oil Company, Philadelphia; T. Rieber, The Texas Company, New York; L. P. St. Clair, Union Oil Company of California, Los Angeles; E. L. Shea, Tide Water Oil Company, New York; E. W. Sinclair, Consolidated Oil Corporation, New York; W. G. Skelly, Skelly Oil Company, Tulsa; W. F. Smith, Standard Oil Company (Kentucky), Louisville; R. W. Stewart, Chicago; W. C. Teagle, Standard Oil Company of New Jersey, New York; J. A. Vickers, Vickers Petroleum Company, Wichita, Kansas; and W. K. Warren, Warren Petroleum Company, Tulsa.

The board of directors heard reports, transacted routine business, and appointed a committee to make a study of the drilling of unnecessary oil wells. The board also adopted a resolution authorizing the president of the Institute to appoint a coordinating committee to deal with problems of waste disposal common to two or more branches of the industry, and to report to the executive committee. This committee coordinates the work done for about 10 years by the Institute in developing effective methods of waste disposal so as to avoid contributing to the pollution of streams.

Caution and Confidence

[*Continued from page 8*]

Oil was thrown on the screen of the first general session of the Institute Tuesday as an industry that is making progress but still faces difficulties. This was the picture offered by Axtell J. Byles, president of the Institute; Baird H. Markham, director of the American Petroleum Industries Committee, and Colonel E. O. Thompson, chairman of the Interstate Oil Compact Commission and chairman of the Texas Railroad Commission.

Byles pointed out that increased consumption, plus effective proration and absence of excessive discoveries have thrown the industry into good balance as to supply and demand. From the experience of last winter when the demand for fuel oil rose suddenly forcing the refining section to make more gasoline than the season required, he pointed to the danger of a re-occurrence. To meet that he advised:

"The answer seems to be to take care of the demand for essential products, from which higher realizations can be obtained, and to let other available fuels gradually make the shortage, if any, in heavy fuel oil."

Byles Scores Close Drilling

He cautioned against following the practice of drilling wells too close together. "By taking advantage," he observed, "of the economies possible by drilling fewer wells, the industry has developed many of the great flush fields, discovered in recent years, in such a manner as to permit a maximum adherence to sound conservation, viz: orderly operation at production rates low enough for both efficient recovery and economic practicality.

"Unfortunately, the practice of drilling only those wells which are necessary to recover the oil in the ground has not been universally adopted; yet it has been demonstrated in some fields that close drilling has resulted in a tremendous investment in unnecessary wells, has substantially increased production costs and has worked in opposition to the efforts made to promote conservation and sustain such economic conditions through the industry as will permit and promote the best production practices."

Another danger outlined is that of drilling wells against decreasing allowables. "To continue drilling wells with diminishing allowables per well must inevitably result in a period of demoralization, with some permanent injury to conservation and to the industry's ability to render its public service and meet its tax burdens."

He complimented the work of the special study committee on well spacing under the general production division.

Interstate Compact Valuable

He said the Connally act, through which the Interstate Oil Compact exists, should be made permanent. Of the compact he said, "In the short period of its existence the Interstate Compact has proved of inestimable value in practical conservation and the nation and the industry owe a debt of gratitude to the states which have joined it and to the statesmanship of the compact commission."

Activity of the American Petroleum Industries Committee over the year was outlined by Baird H. Markham. He predicted further effort to force the blending of commercial alcohol with gasoline for motor fuel, further efforts to increase state gasoline taxes, as well as the threat of using more and more money for purposes other than highways, although the funds come through taxes on gasoline.

Defeat Federal Control

Defeat of federal control of the petroleum industry was credited to the Interstate Oil Compact Commission by Ernest O. Thompson, chairman.

"If," he added, "it had done nothing else and never does anything more, its existence is gloriously justified. I look upon federal control and the attempted regimentation of oil as the beginning of a drive to regiment all productive enterprise and I oppose it as being contrary to our dual form of government and contrary to the genius of democracy."

Other accomplishments of the compact were designated as gaining the support of the industry, making a thorough study of conservation laws and rules of conservation, gaining cooperation of the United States Bureau of Mines, being instrumental in getting a study made of the quality of oil in storage.

Colonel Thompson described the compact as "A constitutional way of approaching a common problem of the sovereign oil producing states, i. e., waste prevention." Later he explained this:

"It leaves all power with the sovereign states as to what shall be done within any particular state but it does bring to all member states the experience and the help of every other oil producing state in the matter of preventing actual physical waste in producing oil and gas."

He made a strong point in his objection to the regimentation of business: "It is my opinion that the oil industry should not allow itself to be regimented. All such attempts will ultimately fail, so why try them now."

Drilling at Fitts

OKLAHOMA FIELD FURNISHES ADDITIONAL OIL PRODUCERS

WEEKLY STAFF REPORT

Tulsa, Okla.—The completion of several more producers in the Fitts field of Pontotoc County and running of the first oil through pipe lines from Coal County were featured activities in the Tulsa area last week.

Oil men were a bit pessimistic concerning the outcome of Pure Oil Company's Baker 1, in Garvin County, which was beginning to show some signs of being a dry hole.

Magnolia Petroleum Company's Metropolitan Life Insurance Company 25, NE NW SW 27-2n-7e, flowed 152 barrels of oil in 1 hour through tubing, and had 3,000,000 cubic feet of gas. It topped the Hunton lime at 3227 feet, and drilled to 3541 feet where it was acidized with 5000 gallons.

The same company's Metropolitan Life Insurance Company 23, SE SW SE 22-2n-7e, topped the Viola lime at 3965 feet and drilled to 4345 feet where it was acidized with 10,000 gallons. It was given a 24-hour potential of 2416 barrels of oil and had 2,225,000 cubic feet of gas. Two-and-one-half-inch tubing was set at 4144 feet.

J. E. Crosbie Inc.'s Hardin 2-A, NW SW SE 30-2n-7e, topped the Hunton lime at 3421 feet and drilled to 3716 feet where it was acidized with 10,000 gallons. Following acid treatment, the well flowed 239 barrels of oil in 1 hour through tubing, and 310 barrels of oil in one hour through casing. Operators were to take potential.

Simpson-Fell's Westheimer 1, SE NW NW 26-2n-7e, topped the Viola lime at 3863 feet; topped the Bromide lime at 4110 feet, and drilled to 4278 feet in the same formation. Operators acidized both horizons, the Viola first with 3000 gallons, and the Bromide with 12,000 gallons. Following this, the well flowed 200 barrels of oil in 1 hour through tubing. It was to take potential.

Operators were waiting on acid at J. E. Crosbie Inc.'s Burris 1-B, NE SW SE 22-2n-7e, which topped the Hunton lime at 3578 feet; topped the Sylvan shale at 3951 feet, and drilled to 3952 feet, where 10,000 gallons of acid was run into the hole.

E. H. Moore et al's Moody 2-A, NE NW NW 26-2n-7e, one of the latest producers in the Fitts field, continued to flow. Late reports from the area state the well produced 359 barrels of oil in 1 hour through casing, accompanied by 6,500,000 cubic feet of gas.

An important northeast edge well, E. H. Moore et al's Deaner 1, NW SW SE 23-2n-7e, had the Woodford shale at 3480 feet and was reported drilling ahead below 3490 feet.

Phillips Petroleum Company's Bates 1, SW NE NW 26-2n-7e, flowed 242 barrels of oil in 1 hour while drilling at 4317 feet. After topping the Bromide lime at 4170 feet, the well drilled into the pay from 4264 to 4267 feet.

Magnolia Petroleum Company's Norris 6, NE SW SE 21-2n-7e, topped the Bromide at 4265 feet, and after drilling to 4340 feet, was acidized with 10,000 gallons. The well then flowed 696 barrels of oil in 6 hours, establishing a potential of 2364 barrels of oil. The flow was accompanied by 4,375,000 cubic feet of gas. The company's Simpson 13, in Section 29-2n-7e, flowed 103 barrels of oil in 1 hour through tubing, with 3,000,000 cubic feet of gas.

E. H. Moore et al's Schaurer 14,

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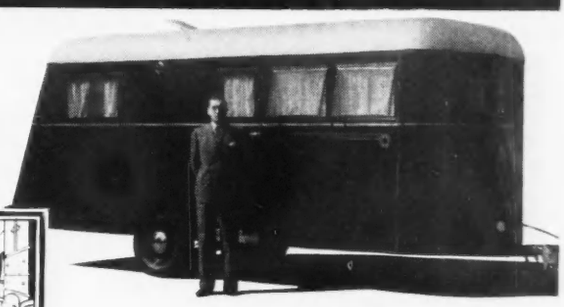

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NEc NW 29-2n-7e, topped the Bromide lime at 4240 feet, had the first Wilcox sand at 4340 feet, and after drilling to 4353 feet, flowed 229 barrels of oil the first hour and 174 barrels of oil the second hour, with 1,000,000 cubic feet of gas. Operators were to run tubing and test.

Coal County Pipe Line

The first oil ever to be run through a pipe line out of Coal County went into the records last week, and was taken from a tank filled by W. A. Delaney's Sawyer 1-A, SW SE NW 7-1n-8e, the extension well of the Jesse field, into Coal County. The oil was run through a line to the Stanolind Pipe Line Company's connection in the Jesse field. Sawyer 1-A was being deepened to the Wapanucka lime, and at last reports was drilling ahead at 1296 feet. It received a rather small potential, amounting to only 237 barrels of oil, earlier in the week, the small flow being blamed on the absence of gas.

Conditions were not good at Pure Oil Company's Baker 1, NEc 7-2n-1e, in the Pauls Valley area of Garvin County. The well topped the second Wilcox sand at 4284 feet, and cored ahead to 4289 feet. In the recovery, operators found light gray porous sand with a slightly salty taste. Unofficial reports state the well may be carried on down to the Siliceous lime.

Sinclair Prairie Oil Company's Culver 1, NEc SW 16-1n-8e, in the Clarita area of Coal County, plugged back from the old total depth of 5610 feet to 5162 feet where operators are to test the Viola lime. Continental Oil Company's King 1, 26-1n-8e, in the same district, was drilling ahead at 4970 feet in the Viola lime with nothing showing. Carter Oil Company's Warne 1, NEc NW 31-3n-9e, was reported drilling at 4780 feet in the Woodford shale.

SOUTH OKLAHOMA

Stephens County wildcat proves disappointment

Ardmore, Okla.—Of prime interest to oil men in southern Oklahoma last week was the disappointing show made by Ed Parson's Olson 1, the major wildcat in Stephens County, which found mud and salt water when the plug was drilled. Another poor showing was made by a wildcat in Tillman County, and operators in the state were watching with interest the results of acid treatment being given Sinclair Prairie Oil Company's test in Murray County.

The Olson 1, C SW SW 21-2n-8e, near Marlow in Stephens County, and being drilled by Ed Parson and others, drilled the plug early Monday, November 9, and found 135 feet of mud with a small show of oil and 225 feet of salt water in the hole. This information, which was thought to have some effect on leasing in the area since the well had a good showing of oil and gas in a saturated sand at 5216 feet, apparently had no effect, as the leasing was reported continuing strong. Operators decided to acidize the well, and after bailing 1100 feet of fluid from the hole, were to run 500 gallons of acid. If the treatment proved effective, another larger amount of acid was to be used on the well.

Tillman County

In the Frederick area of Tillman County, Indian Territory Illuminating Oil Company and Foster's Hatler 1, SWc NE 32-2s-17w, topped the Cisco sand series around 2940 feet. A core was taken from 3005 to 3020 feet and operators recovered 10 feet of sandy conglomerate which showed some saturation. A drill stem test, however, showed 35 feet of mud in 30 minutes with no show of oil.

Sinclair Prairie Oil Company et al's Lancaster Trust Company 1, C SW NE 10-1s-2e, near Davis in Murray County, early in the week drilled to 3002 feet and set 7-inch casing at 2952 feet. When bailed to the bottom, operators found about 21 feet of oily mud in the hole. Fresh water was then circulated and showed only a rainbow of oil. It was bailed to the bottom and acidized with 500 gallons. It was shut in, waiting for the acid to react.

Gulf Oil Corporation's Johnson 3, C. SW 28-2s-3w, in the old Fox field of Carter County, had bailed down to 6100 feet and had nothing showing. Water which had been coming into the hole was stopped and the Hunton lime drilled between 7404 and 7497 feet. The well was then shot with 195 quarts. Work has been suspended temporarily.

Sinclair Prairie Oil Company's Stockton 1, SEc SW 26-6s-2w, in the Oswalt area of Love County, was rigging up standard tools and was to be ready for testing the early part of this week.

On the Carter County side of the Tussy pool, Skelly Oil Company's Miller 1, NE NW NE 5-1s-3w, bailed down 1000 feet and got a slight show of oil on water. Operators were swabbing through 2-inch casing which was set at 2794 feet.

LARGE OUTPUT

Good well in Moore Pool is feature of activity

Oklahoma City.—Drilling operations remained at a rather low ebb in this part of the Sooner State, with the best well being reported from the Moore pool of Cleveland County. Many operators are watching the south and west edges of the Edmond pool of Oklahoma County, where two locations have just been made.

Anderson-Prichard Oil Company's State 1, SWc SE 16-10n-2w, was the good producer, which flowed 1107 barrels of oil in 20 hours with the master gate opened only three turns. During the first hour, the well flowed 68 barrels of oil and had 20,000,000 cubic feet of gas. In the second hour it flowed 42 barrels of oil and had 20,000,000 cubic feet of gas, with 1900 pounds back pressure. The well averaged about 11,000,000 cubic feet of gas during the 20-hour test. The oil was said to have a gravity of 54.

Another good well in the field was Denver Producing & Refining Company and Amerada Petroleum Corporation's Kellar 1, NWc NE 34-10n-2w, which filled 3000 feet with oil and was acidized with 1500 gallons. Operators were bailing 4500 feet from the top of the hole and had about 1000 feet of oil standing on top of water in the hole. The well had been plugged back to the Simpson sand.

Meanwhile, the most westerly test in the field, Blackstock Oil & Gas Company was digging cellar. It is their Tagtmeyer 3, NW NE SE 36-14n-4w, and is a west offset to Tagtmeyer 1, an 8000-barrel well which opened the new area to drilling.

South Outpost Starts

At the extreme south end of the field, Continental Oil Company and others were starting cellar for Hediger 1, NWc SE 6-13n-3w, and will be drilling in shortly.

Carter Oil Company's Walker 1, SW NE SW 27-10n-2w, cored from 7297 to 7302 feet, and recovered three feet of the core. The top two feet were coarse sand bearing a small oil stain and an odor of gas. The last foot was green shale, also bearing a show of oil and gas. Operators were to core ahead.

In the Oklahoma City pool proper, two tests were nearing the Wilcox sand level, while a third was waiting on cement before starting drilling around the latter part of the week. Knox Garvin et al's Gray 1, near Northeast Eleventh Street and Laird Avenue, was drilling at 6285 feet early in the week, and was due to pick up the pay within the next few feet. Sunray Oil Company and Phillips Petroleum Company's Harn 3, at Nineteenth and Lincoln Boulevard, was drilling ahead below 6201 feet. Black Gold Petroleum Company's Hayes 1, near Park Place and Laird Avenue, was due to drill plugs Friday or Saturday of last week.

A good producer was had in the Edmond pool, as Ohio Oil Company's 2-Dahl 3, NW NE SW 31-14n-3w, was shot at 6705 feet and flowed 249 barrels of oil in 30 minutes and had 13,000,000 cubic feet of gas.

OKLAHOMA
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
CARTER COUNTY—		
Gibson & Jennings, Harrel 1, se se nw 20-4s-2w	5	1533
COMANCHE COUNTY—		
William Davis, Aetna Life 1, ne ne ne 22-2n-15w	*	163
CREEK COUNTY—		
Klingensmith, Gilcrease 2-A, cwl se se 33-17n-12e	150	2282
Sinclair Prairie, Gilcrease 13, cel sw se 33-17n-12e	200	2275
Stanolind-Amerada, Roy Hoffman 1, se se sw 32-15n-3e	270	5003
Sinclair Prairie, Ella Jones 18, se se nw 3-17n-7e (pb 2571)	20	2580
B. B. Jones 4, se se nw 4-17n-7e (otd 2670)	16	2718
Big 4 Pet, Adams 1, ne nw ne 29-17n-7e	*	2899
W. C. Elliott, G. Smith 1-A, c ne se, 18-19n-9e	10	2330
JACKSON COUNTY—		
G. S. Scheig, Fox 2, nw nw nw 13-1n-20w	*	1515
C. R. Conyer et al, Cobb 1, nw ne ne 22-1n-20w	*	1150
Gulf Oil, S. J. Ellis 6, ne ne se 6-1s-19w	327	2633
JEFFERSON COUNTY—		
Bridwell Oil, Barnett 3, ne se ne 30-6s-5w	80	1519

Company, Well and Location	Init. Prod. Bbls.	Depth
LINCOLN COUNTY—		
Sinclair Prairie, Hoyt "B" 2, nw nw ne 5-14n-3w	230	5043
OKFUSKEE COUNTY—		
Chapman, Cudjo 5, ne se se 25-10n-8e	480	1754
Blackwell O&G, Dolton 7, ne nw ne 36-10n-8e	550	1753
Arkansas Royalty, Fisher 2, se sw se 18-10n-9e	120	1820
J. J. Deaner, Deaner 3, ne sw ne 19-10n-9e	150	1818
Sinclair Prairie, Fisher 1, ne ne sw 19-10n-9e	72	1819
Stekoll, Johnson 2-A, se sw ne 2-10n-11e	*	1740
Baker, Harjo 1-A, nw se se 16-13n-8e	*	2502
R. Vincent, Hockensmith 2, ne ne se 13-13n-10e (pb 2520)	15	3341
OKLAHOMA COUNTY—		
R. Olson, Wilson 1, ne ne sw 22-12n-3w	2064	6485
Ohio Oil, Pettigrew 1, se sw se 8-13n-3w (pb 6645)	286	6672
OKMULGEE COUNTY—		
Klingensmith, McIntosh 1-A, sw ne nw 17-15n-12e	*	2680
Pine, Beams 1, ne ne sw 4-15n-14e	¶8	1594
Reliance Oil, Cowan 8, cnl se sw 26-16n-11e	25	1873
OSAGE COUNTY—		
E. O. Platter, 14, ne se ne 30-22n-9e	5	500
Lewis Prod. Drummond "B" 1, nw nw nw 34-24n-7e	200	2622
Skelly Oil, Smith 8, se se nw 26-26n-6e	2662	2920
Kewanee O&G, Hale 7, ne sw se 27-26n-6e	270	2942
PITTSBURG COUNTY—		
Utility Prod, Koehler 4, se sw sw 11-7n-18e (otd 1914)	¶10	2135
PONTOTOC COUNTY—		
Continental, D. Brown 1, ne se ne 11-1n-7e	118	4730
Fleetborn, Morin 5, ne se se 20-2n-7e	¶2¼ & 3292	4310
Akin Oil, Dannials 2-A, sw nw se 21-2n-7e	¶2¾ & 5496	3690
Stahl Pet, Dennis 4-B, se sw sw 21-2n-7e	5760	3607
Dennis 7, se nw sw 21-2n-7e	¶3 & 12,480	3670
Blackstock, Kirby 1, sw ne se 22-2n-7e	¶½ & 632	4350
Simpson, Westheimer 2-A, sw nw nw 26-2n-7e	¶3¼ & 5685	3741
Continental, Holkum 4, nw nw se 27-2n-7e	¶ 4 & 4968	3280
Sinclair Prairie, Burris 14, ne ne nw 27-2n-7e	¶ 3 & 4152	3510
Magnolia, Statler 3, sw se sw 28-2n-7e	315	4639
Moore et al, Harper 1-A, sw sw ne 29-2n-7e (pb 4233)	24	4373
Moore, Wirick 9-A, nw se sw 29-2n-7e (pb 4375)	1260	4465
Carter, Richards 20, se sw se 30-2n-7e	¶ 1½ & 3876	4410
Southard & Miller, Wilson 1, nw se sw 26-4n-5e	*	50
Lake, Robertson 8, sw se sw 19-5n-5e	*	2626
Larson, Robertson 1-A, csl nw sw 23-5n-8e	12	785
POTTAWATOMIE COUNTY—		
Atlantic, Thomas 1, ne ne nw 9-7n-4e (pb 4460)	*	3914
Burke-Greis, Wisner 2, nw sw ne 6-9n-6e (pb 4460)	290	4462
SEMINOLE COUNTY—		
Carter, Campbell 1, nw nw sw 20-9n-6e (otd 4173)	25	4242
Magnolia, Andrews 1, ce¼ ne nw 14-10n-6e (otd 4128)	2059	4176
STEPHENS COUNTY—		
Magnolia, Worrell 2 ne nw nw 19-1s-8w	*	2273
McAllister et al, Parrott-Trout 1, nw sw sw 1-2s-8w	35	1480
McCasland et al, Hilderbrandt 2, nw nw ne 1-3s-7w	*	2407
TUSA COUNTY—		
Anthony, Wilcox 1-A, nw nw nw 3-16n-12e	480	2286

*Failures; †Junked; ¶Million cu. ft. gas.

WALDO L. GUNDLACH, formerly handling sales promotion work with Standard Oil Company of Indiana dealers, has been transferred to the advertising department of the company in Chicago, where he is in charge of industrial advertising.

PIPE TAKEN UP

Section of Oklahoma line will be used elsewhere

Tulsa.—Oklahoma Pipe Line Company has started removing 38 miles of 8-inch line between Council Hill and Kinta, Haskell County, Oklahoma. This line was laid in 1923, and is being reconditioned by cleaning and spot-welding, and is being prepared for further use in welded line by beveling ends at a pipe yard near Checotah.

The removed line is to be used in laying two loops, of 15 miles each, on the northeast line of the company from Little Rock Junction to Cromwell and from Hewitt to a point near the base of the Arbuckle Mountains. The addition of these two loops to the system will allow oil to be pumped directly from Hewitt to Glenn pool, rather than via the DeQueen station.

In addition to the above work, a 37,000-barrel tank is planned for Francis station. This construction, as well as the line work, is to be completed by January 1, 1937. The same firm is also removing 25 miles of 8-inch line between Smithville, McCurtain County, Oklahoma, and the Arkansas state line. This line is to be reconditioned and held in storage at Cove and Gillham, Arkansas, for future use.

NEW TULSA SHOW

Chicago.—The next International Petroleum Exposition will be held in Tulsa, Oklahoma, May 14 to 21, 1938, celebrating its fifteenth anniversary, according to an announcement at the American Petroleum Institute meeting here at the Stevens Hotel.

Exposition President W. G. Skelly, who made the announcement, said that the Tulsa oil show, which now is rated as the largest industrial show of any one industry, looms to exceed its exhibit and attendance records in 1938. He pointed out that before definite dates were announced, three-fourths of the available space on the 20-acre plant site had been reserved and that Tulsa hotels had received a great number of advance reservations.

Skelly said that much of the mechanical progress of the oil industry is due to the fact that the exposition helped to broadcast new ideas and inventions.

New Kansas Field

WILDCAT LIKELY TO YIELD ABOUT 100 BARRELS DAILY

WEEKLY STAFF REPORT

Wichita, Kansas.—Although operations were quieter than usual in Kansas fields last week, oil men in the state managed to open at least one new producing area, and they extended the producing limits of several established pools.

A rather active leasing play is looked for in the area southwest of Chanute, in Wilson County, eastern Kansas, where a new well appears to be good for about 100 barrels of oil daily.

The Beaver pool of Barton County had its first producer completed in the true basal sand, in the same district with a recent extension well.

The looked-for opener in Wilson County is a test on the Mike Rausch ranch farm, NEc 10-28s-17e, eight miles southwest of Chanute, which appears to be good for about 100 barrels of oil daily from a sand encountered at approximately 1000 feet. The strike is expected to revive activity in that area. A field discovered last year between Earlton and Altoona had yielded a number of producing wells, and lends impetus to interest being accorded the area.

Hauschild Extension Looms

A half-mile extension appears to have given the Hauschild pool of Rice County as Tom Deal et al's O'Connell 1, NWc NE 14-21s-7w, northwest of Nickerson, began showing from the conglomerate at 3385 feet. When the plug was drilled, operators found more than 600 feet of oil standing in the hole. Deeper drilling caused the hole to cave. Operators could not be reached for a decision regarding further operations at the well. The Hauschild pool is gaining rapidly in rank as one of the leading pools of the state, having a combined potential of 74,440 barrels of oil.

Shell Petroleum Corporation's Reece 3, CEL SW 11-26s-9w, in the Laredo pool of southwestern Reno County, was reported as being good for nearly 8000 barrels of oil daily from the Viola lime at 4134 feet, on the basis of a preliminary test. Three producers on the Reece lease, which is exclusive Shell property, have a combined potential of 27,000 barrels of oil. One producer, recently completed by the Empire Oil & Refining Company, extended the pool one half-mile west, and is good for more than 6000 barrels of oil. Nine producers in the pool have a potential in excess of 78,000 barrels of oil.

Sumner County also had a good producer completed by E. B. Shawver at Erker 14, SEc SW 33-31s-1w, in the Wellington pool. The well was reported flowing after drilling to 3650 feet, carried 14 feet into the chat.

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NWc SW 4-12s-17w, extended the Shutts pool of Ellis County one-half mile when it began pumping 25 barrels of oil per hour from the Oswald lime at 3347 feet. Top of the lime was found at 3310 feet. Operators were planning to acidize the test.

Lario Oil & Gas Company's Marshall 1, NW SE NE 36-11s-18w, two miles northeast of the same company's discovery producer in the Walters pool, made 17 barrels of oil an hour natural after swabbing off the head at 3643 feet in the Silicious lime. Deepened to 3650 feet, the well had a four or five-barrel increase per hour.

Beaver Well Important

The first producer in the Beaver pool of Barton County to be completed in the true basal sand and scheduled to cause increased activity in that sector, is Darby Petroleum Corporation et al's Turgeon 2, SWc 11-16s-12w, which recently extended production one and one-half locations northwest. On the latest test, the well pumped 392 barrels of oil natural from the basal sand at 3353 feet.

Lario Oil & Gas Company and Atlantic Oil Producing Company's Meyer 2-A, CSL SW 13-20s-11w, on the east side of the Peter pool, flowed 1142 barrels of oil natural from the Siliceous lime at 3274 feet, the total depth.

The same operator's Peter 2, south offset to the new producer, on a retest, made 2511 barrels of oil natural from the Siliceous lime at 3274 feet following a change in equipment. The retest flow establishes the well as one of the largest producers in the area.

Continental Oil Company's Lagree 1, NWc SE 32-21s-1w, in the Graber pool of McPherson County, topped the Hunton lime at 3311 feet, and drilled to 3340 feet, where 300 feet of oil came up into the hole. Operators were to acidize after running tubing and rods.

The company's Blair 1, in Section 21-21s-1w, was completed for 1508 barrels of oil from the Hunton lime at 3338 feet, after being given acid treatment.

Harbaugh Pool

National Refining Company's Reinhardt 2, SWc SE 25-14s-15w, in the Harbaugh pool of Russell County, appears to be another good producer for that pool. Topping the Siliceous lime at 3142 feet, the well was drilled ahead to 3157 feet, where it filled 2900 feet with oil in 12 hours. Tubing and rods were being run preparatory to taking a production test. It extends the pool one location south.

Location has been staked by Duwe & Brouk for Baker 1, NE SE SW 16-17s-13w, three miles north of Hoisington in Barton County. The test is located one half-mile northeast of Gulf Oil Corporation's Soderstrom 1, which had a 30-barrel showing of oil from the Siliceous lime at approximately 3500 feet.

Skelly Oil Company's Bloomer 4, SE SW NE 36-17s-11w, the most southeasterly test in the Bloomer pool, stopped at 3252 feet in the Siliceous lime and filled 3150 feet with oil in two hours.

In the Whelan pool of Barber County, Vaccar Corporation's Swartz 1, SEc 30-31s-11w, a recent completion, received a potential of 1164 barrels of oil. This production is reported to have upset earlier predictions on chat production south of the Barton Arch. Small recovery from the chat was the assumption of most operators interested in the area. Swartz 1 topped the Mississippi chat at 4303 feet, and found saturation at 4317 feet. Nearest oil production is about 25 miles north in the Cunningham pool.

York State Oil Company's Gugler 1, SWc 36-12s-21w, in western Trego County, an area which has recently had several dry holes drilled, had 1400 feet of oil standing in the hole, coming from a total depth of 3839 feet in the Siliceous lime. Five-inch casing was set on top of the lime before testing was begun.

New Locations Decline

There were 13 fewer location made in Kansas last week, the total reaching 49 as compared with 62 for the previous week. Rice County led with 11; Russell County was second with 7. Barton County had 6 and Stafford County 4. McPherson and Reno counties each had 3, and there were 2 each for Greenwood, Harvey, and Sedgwick counties. Barber, Butler, Coffey, Cowley, Ellsworth, Kingman, Marion, Mitchell and Sumner counties each had 1.

KANSAS
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
BARBER COUNTY—		
Vaccar Corp, Swartz 1, se se se 30-31s-11w	1560	4315
BARTON COUNTY—		
Republic Gas, Bloomer 1, ne se nw 36-17s-11w (otd 3283)	1000	3296
BUTLEY COUNTY—		
Mohawk Oil, Bond 1, sw sw ne 2-25s-5e	7	2286
Hall & Ellis, Corbit 1, nw sw se 23-29s-5e	*	2846
CHASE COUNTY—		
Polhamus et al, Leedy 1, se ne ne 26-22s-9e	*	2525
COWLEY COUNTY—		
Floyd, Frost & Study, McKinley "A" ne se ne 33-31s-3e	2030	3305
ELLIS COUNTY—		
Ohio Oil, Karlin 1, ne ne nw 10-13s-17w	219	3413
Bridgeport Machine, Ubert 1, ne ne nw 12-13s-18w	412	3707
Palmer et al, Ruder 2, ne ne se 8-15s-18w	*	3596
Bridgeport et al, Madden Estate 2, ne nw nw 26-15s-18w	619	3595
ELLSWORTH COUNTY—		
Carter et al, Anna 2 se se ne 27-17s-9w	*	3196
GRAHAM COUNTY—		
Murphy & Alcorn, Wammhoff 1, cnw 27-10s-22w	*	4123
RENO COUNTY—		
McPherson Drlg, Scheurchzer 5, cs½ s½ sw 17-24s-4w	940	3379
Ohio Oil, Priddle 4, sw se se 17-24s-4w	322	3369
RICE COUNTY—		
Allison & Fitzwilliams, Foley 1, nw sw nw 17-19s-7w	*	3610
Torry & Feaster et al, Brunken 3, se se nw 32-19s-9w	595	3239
Gulf Oil, Knop 2, ne nw nw 33-19s-10w	1689	3298
Empire, Coldwater "B" 1, ne ne nw 17-20s-9w	770	3285
Stanolind, Specht 5, ne ne se 6-20s-10w	2173	3317
RUSSELL COUNTY—		
Palmer, Killian 8, ne sw nw 27-13s-14w	277	3270
Bridgeport Machine, Witt 4-B, ne ne sw 3-14s-15w	414	3315
Saco & Crown, Eichman 1, nw ne se 34-15s-13w	365	3315
SUMNER COUNTY—		
Stelbar, Barlow "B" 2, nw nw se 33-31s-1w	590	3701
TREGO COUNTY—		
McNeely et al, Lemke 1, nw nw sw 7-11s-22w	*	4040
Pigott Inc, et al, Burkett 1, csw 15-11s-22w	*	3889
J. J. Hall et al, Deines 1, se se se 12-13s-24w	*	4857
WOODSON COUNTY—		
Sheedy et al, Eagen 1, ne ne se 11-26s-14e	*	1630

*Failures; †Junked; ¶Million cu. ft. gas.

Busy With Offsets

MONUMENT NEW LOCATIONS EXCEEDING COMPLETIONS

WEEKLY STAFF REPORT

Hobbs, N. M.—Offset drilling requirements in Monument field were responsible for 10 of the 13 new locations authorized for Lea County the past week. New locations have exceeded or equaled completions in the county for eight consecutive weeks. During the past week there were seven oil producers and a semi-wildcat failure on the completion list. Monument field has received the bulk of the new drilling in spite of the fact that its allowable per well currently averages 54.8 barrels daily because of its two pipe line outlets restricting runs to 12,000 barrels daily. Other Lea County areas served by majors average 100 barrels daily per well.

Emperor Oil Company, Fort Worth, failed to make a producer in drilling State Empire 1, C SW SW 5-21s-35e, five miles west of the Eunice field, and has been abandoned in sulphur water at 3852 feet, or 200 feet below sea level. It is a northwest diagonal offset to a small producer developed in 1928 by Empire Oil & Refining Company from lime at 3815-3831 feet, but later abandoned because of water. The latter drilled failures to the northeast and south.

Anderson-Prichard Production Corporation, Oklahoma City, scored the largest producer in completing its H. M. Britt-Conoco 2-A-6, C NE SW 6-20s-37e, flowing 132 barrels oil per hour through 2-inch tubing choke after using 1000 gallons of acid in lime at 3905 feet. Previous attempts to complete at 3890 feet, or 308 feet sub-sea, were abandoned because of high gas-oil ratio. This concern is starting up on H. M. Britt-Conoco 5-A-7, C NE SW 7-20s-37e, and Britt-Conoco 6-A-7, C SE SW 7-20s-37e.

Ohio Completes Well

Ohio Oil Company completed its Barber 5, C NW NW 5-20s-37e, flowing 106 barrels oil in 3 hours through 1-inch tubing choke, after using 3000 gallons of acid in lime at 3897 feet, with an elevation of 3571 feet. Operations have been started on Barber 6, located on the southwest unit of this 240-acre lease, and for Barber 7, C SE NW 5-20s-37e.

Empire Oil & Refining Company's D. L. Laughlin 2, C SW SE 5-20s-37e, produced mostly gas when tested through 3-inch tubing at 3890 feet. The well has been killed to install tubing packer. Seven-inch pipe was cemented at 3750 feet, and in deepening to the oil horizon a flow of gas estimated at 50,000,000 cubic feet daily was picked up below the casing seat. An attempt was made to cement off this gas with a squeeze job, but it apparently failed to yield the desired results. The company is starting up on Laughlin 3, an east offset, and also State 2-F, C NE SE 30-20s-37e. The latter offsets a small producer between the Eunice and Monument fields.

Gulf Oil Corporation is starting operations on State-Graham 1-G, C SW SE 17-19s-37e, northeast outpost location, and also D. A. Williams 3, C SE SE 29-19s-37e. Its Harry Culp 3-B, C SE SE 31-19s-37e, flowed 105 barrels oil through open 2-inch tubing in 6 hours on preliminary gauge at 3895 feet. Continental Oil Company and The California Company awarded drilling contract for H. M. Britt 1-A-8, C NE NW 8-20s-37e.

Atlantic Refining Company's State-Catron 3-L, C lot 5, 6-21s-36e, northwest edge well for the Eunice field, flowed 27 barrels per hour at start of gauge and averaged 14 barrels hourly for 18 hours through tubing from lime at 3857 feet, or 300 feet sub sea. In the south portion of the main field, Texas Pacific Coal & Oil Company's State 2-A, lease 2, C NW SW 5-22s-36e, was rated at 25 barrels daily after using acid at 3815 feet, and flowed by heads when deepened to 3861 feet, or 269 feet sub sea. It will be re-acidized. Sun Oil Company's J. A. Akens 3, C SW SE 3-21s-36e, flowed 460 barrels oil through open tubing after using 4000 gallons of acid at 3859 feet; but its Akens 4, C NE SW 3-21s-36e, failed to flow after filling hole with oil following 4000-gallon acid treatment at 3860 feet, with an elevation of 3570 feet. Gulf Oil Corporation is starting up on State-Orcutt 3-C, center lot 7 and State 4-C, center lot 6, 6-21s-36e.

NEW MEXICO

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
LEA COUNTY (Eunice Field)—		
Atlantic Ref. Co., State-Catron 3-L, C Lot 5, 6-21s-36e	600	3857
Empire O&R Co., State 1-F, c sw se 30-20s-37e	2500	3840
Gulf Oil Corp., State-Bell 1-D, nw sw 6-21s-36e	500	3880
Sun Oil Co., J. A. Akens 3, c sw se 3-21s-36e	750	3859
LEA COUNTY (South Eunice Field)—		
Samedan Oil Corp., S. B. Hughes 1, c ne sw 4-23s-37e	113	3648
LEA COUNTY (Monument Field)—		
Anderson-Prichard Prod. Corp., Britt-Conoco 2-A-6, c ne sw 6-20s-37e	5000	3905
Ohio Oil Co., Barber 5, c nw nw 5-20s-37e	2000	3897
LEA COUNTY (Wildcat)—		
Emperor Oil Co., State-Empire 1, c sw sw 5-21s-35e	*	3852

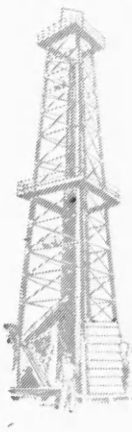
*Failures; †Junked; ¶Million cu. ft. gas.

START 10-INCH LINE

Wink and M'Camey to be linked by Shell carrier

Midland, Texas.—Immediate construction of a 75-mile 10-inch welded crude line between Wink and McCamey has been authorized by Shell Pipe Line Corporation to supplement limited facilities now available from two 6-inch carriers. The existing lines enable the company to handle a maximum of 35,000 barrels of mixed grades of crude from fields in southeastern New Mexico and Winkler County, Texas, to McCamey junction, where connection is made with its 10-inch carrier that extends southeast to Houston and a second 10-inch line that makes deliveries to Whiting, Indiana, and intermediate points in the Middlewest.

The new Wink-McCamey pipe line unit will be capable of handling 50,000 barrels of crude daily. When it goes into service the two smaller lines will be reserved for emergency use, and existing pump stations will be tied into the 10-inch carrier.



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Another Seminole

GAINES COUNTY TEST OPENS NEW FIELD IN WEST TEXAS

WEEKLY STAFF REPORT

Midland, Texas.—The Seminole geophysical prospect, Gaines County, originally outlined by seismograph crew late in 1933, has vindicated companies and individuals that paid fancy prices for lease and royalty protection within the past two years, by yielding a commercial oil producer from lower section of the Permian lime horizon at 5022 feet, or 1704 feet sub-sea. Amerada Petroleum Corporation et al's S. J. Averitt 1-A, C NE NE Section 228, Block G, about three miles northwest of Seminole, offset to a junked gasser at 4910 feet, was showing for a flowing well Friday, November 13, while cleaning itself of drilling mud through open tubing, with packer installed at 4980 feet.

No estimate was available as to the volume of production, but a substantial increase was considered certain over a previous gauge of 2½ barrels of oil per hour at 5015 feet. Tubing packer was installed to permit acid treatment without stepping up the gas flow from the upper section of the lime.

Top of lime was logged at 4545 feet by the Seminole well, and first oil stain appeared in cuttings recovered from rotary returns at the 4996-foot level. Soft lime section drilled at 5011-5015 feet showed free oil. Production test made through 2½-inch tubing at the latter depth on November 10 yielded 2½ barrels of 32 gravity sulphur oil per hour. Gas production through open casing and tubing gauged at rate of 6,800,000 feet daily, but subsided to about 1,000,000 feet daily. Bottom hole pressure bomb reading was made before the well was ordered killed by F. Wayne Covault, superintendent of Texas-New Mexico operations, to deepen. The seven feet of additional hole was drilled in 35 minutes.

Ownership of Well

Ownership of this first oil producer for the Seminole structure reverts to Harry Adams et al, in accordance with contract made last August by Amerada Petroleum Corporation and five majors, controlling the bulk of the leases in the area. Adams et al's Averitt-Ohio 1 developed a junked hole last March after drilling to 4910 feet, where the well tested 12,368,000 feet of sulphur gas with 2100 pounds closed-in pressure. Due to repeated fishing jobs the casing was badly damaged, and surrounding lease owners joined in working out a plan that would make it possible to take over and plug back the original well from the prolific gas horizon for fear of a blowout.

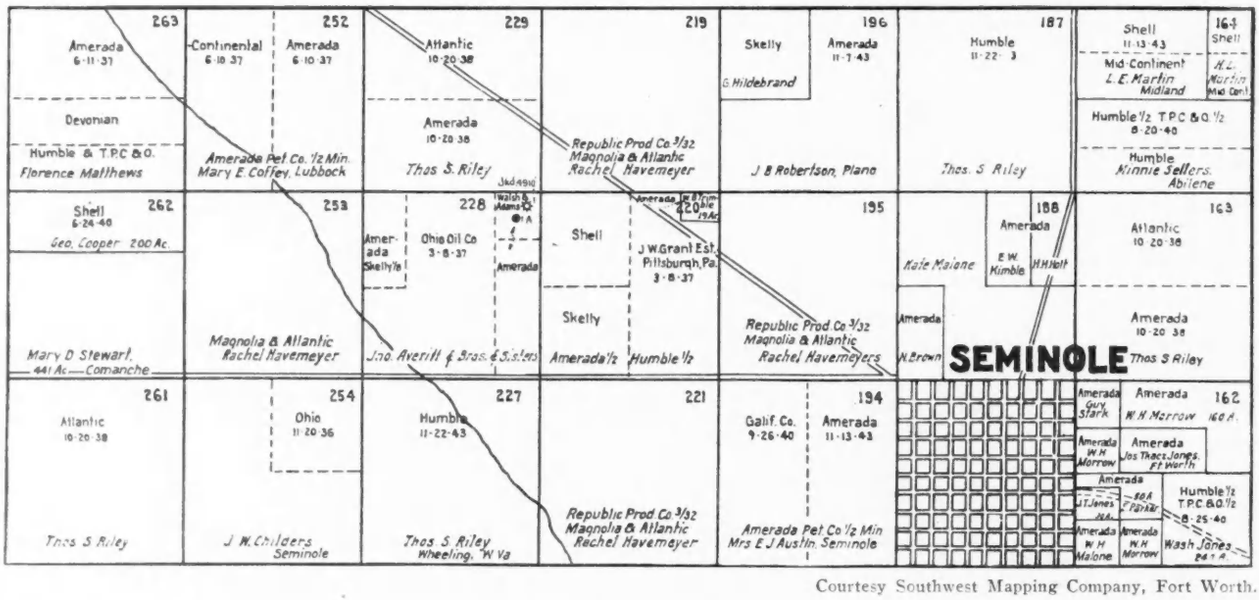
The group advanced Adams $27,000 cash to be paid W. T. Walsh et al for their interest in the gasser and 40-acre site. The latter are also to receive a substantial oil payment. Amerada et al are to receive one-half of the production revenue after surrendering the well to Adams until the cash advance and cost of the completed producer is amortized. The original gasser was plugged back late in August to 3609 feet, and re-completed with a flow of sweet gas rated at 500,000 feet daily.

Outlined by Geophysics

Amerada Petroleum Corporation is credited with having made the first known outline of the Seminole structure late in 1933 while making an extended survey in the north portion of the basin area. The company took leases on about 8000 acres in the general area, and also acquired about 2000 royalty acres. Humble Oil & Refining Company was also one of the early arrivals, and late in 1934 acquired one half interest in Texas Pacific Coal & Oil Company's 3100-acre spread for $50,000 cash, besides assuming full cost of the first two wells, if development is undertaken. In June, 1935, Humble Oil & Refining Company boosted its cash bonus offering to $100 per acre for protection within the townsite.

Cochran County Discovery

Averaging 100 barrels of pipe line oil daily by heads, Honolulu Oil Corporation and Cascade Petroleum Company's Duggan 1, southeastern Cochran County wildcat producer and northern most well in the basin area, may require a new string of pipe to case off the damage sustained by the 7-inch pipe after nitro shot in lime at 5019-5060 feet. The hole was plugged back from 5098 feet to 5068 feet because of small amount of water. The oil tests 32 gravity. This partnership has the only oil producer in Yoakum County, and a second test being drilled by Texas Pacific Coal & Oil Company on the Bennett discovery leasehold is drilling with cable tools



Courtesy Southwest Mapping Company, Fort Worth.

Majors hold lease on the bulk of the acreage surrounding the wildcat producer developed by Amerada Petroleum Corporation et al on the Seminole structure, Gaines County's first commercial oil area. Size of the tracts will have a tendency to forestall unnecessary drilling.

below 2620 feet. The latter is checking about 25 feet higher structurally. In southwestern Hockley County, The Texas Company and unit members' Bob Slaughter 1 has been delayed at 3065 feet as result of 8-inch pipe parting while preparing to set on bottom.

Water in Ector Test

York & Harper, Inc., and Crafton Oil Company's P. Slator 1, located 5½ miles west by south of nearest production in the Goldsmith field, Ector County, was considered eliminated as a prospective producer as result of encountering sulphur water at 4440 feet, or 1191 feet below sea level, with increases recorded in drilling to 4544 feet. A new depth record for Ector County has been attained by Sinclair Prairie Oil Company's J. L. Johnson 1-A, located three miles northeast of nearest production in the Foster field, after drilling to 6950 feet, where it was logging soft lime section. Despite a favorable structural position this wildcat failed to make a producer in the Foster lime pay. Broderick and Calvert, Inc.'s J. L. Johnson 1, offset to production in the Foster field, is rated among the largest wells in making an initial flow of 611 barrels of oil after nitro shot at 4275 feet. Shell Petroleum Corporation's E. F. Cowden 1, third producer for the Harper pool, gauged 240 barrels initial after shot in lime at 4355 feet, thereby perpetuating lease on a large block by a margin of about 10 days.

Seven-inch pipe has been cemented at 6090 feet in Gulf Oil Corporation's W. N. Waddell et al 2, second Ordovician lime test for the Sand Hills structure, Crane County, after plugging back from 6709 feet to 6287 feet because of sulphur water in Ellenberger topped at 6507 feet, or 3838 feet below sea level. Production test will be made of Simpson lime and sand zone entered at 5995 feet, with oil and gas showings on drill stem tests. Ohio Oil Company's Goode 1, northeastern Terrell County Ordovician prospect, was drilling below 6950 feet, and apparently still in the Pennsylvanian.

WEST TEXAS
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
CRANE COUNTY (Gulf-McElroy Field)—		
Gulf Oil Corp., McElroy 140	496	2923
CRANE COUNTY (Sand Hills Field)—		
Humble, J. B. Tubb 4	821	4420
ECTOR COUNTY (Foster Field)—		
Barnsdall Oil Co., H. C. Foster 2	252	4222
Broderick & Calvert, Inc., J. L. Johnson 1-C	611	4275
ECTOR COUNTY (Goldsmith Field)—		
Wm. H. Dunning, Jr., et al, H. E. Cummins 1-B	432	4300
Empire O&R Co., H. E. Cummins 1-C	700	5293
ECTOR COUNTY (Wildcat)—		
Grisham-Hunter Corp., R. B. Cowden 1, sec 10	10	4657
ECTOR COUNTY (North Cowden Field)—		
Mid-Continent Pet. Corp., B. H. Blakeney 2	531	4227
Tide Water-Atlantic, O. B. Holt 1-C	676	4296
GLASSCOCK COUNTY—		
Conoco-Group 1 Oil Corp., H. Phillips 6	420	2510
HOWARD COUNTY—		
Ambassador Oil Corp., Reed 1	†	450
Conoco-Group 1 Oil Corp., S. T. Eason 2-A	1333	2455
JONES COUNTY—		
Merry Bros. & Perini, Inc., J. H. White 1	*	2376
F. A. Oyster, A. R. Forster, Ungren & Frazier, C. H. King 1	*	2034
W. H. Peckham-Danciger O&R, Inc., Stamford Water Works 2	30	1941
McCULLOCH COUNTY—		
W. S. Spence et al, fee 1	*	2276
PECOS COUNTY (Pecos Valley Field)—		
M. C. Ulmer et al, Pecos Valley Oil Co. 1	*	1690
PECOS COUNTY (Yates Field)—		
Ohio Oil Co., I. G. Yates 9-G	6264	1338
UPTON COUNTY (McCamey Field)—		
Homestead O&G Co., M. C. Powell-Pure 3	482	2731
UPTON COUNTY (McClintic Field)—		
Storey, Freibele & C. C. Duffy, H. L. McClintic 9	250	3050
WARD COUNTY—		
California Co., A. B. Gordon 17	1339	2525
A. B. Gordon 37	427	2525
I. F. York 24	357	2535
California-Atlantic Ref. Co., I. B. McFarland 2	*	2650
Empire O&R Co., McDonald 11	732	2480
A. R. Eppenauer et al, University-Stanolind 2	2850	2755
Gulf Oil Corp., E. W. Estes 5	1334	2940
A. E. Lynch et al, Himmel 1-B	329	2390
WINKLER COUNTY (Emperor Field)—		
Emperor Oil Co., Halley-Woodley 2	1162	2895
TP Coal & Oil Co., Brown-Altman 2, lse 2	73	2965
WINKLER COUNTY (Henderson Field)—		
Humble, J. B. Walton 7-C	758	3102
WINKLER COUNTY (Sayre Field)—		
Humble, J. F. Howe 16	872	2995
Illinois Oil Co., Abilene State Bank-Conoco 3-A	1937	3106
Joe C. Maxwell, Inc., Gar-Tex O&G Co. 1	800	3107
Mid-Continent Pet. Corp., Walton 7	1004	2960
W. L. & E. J. McCurdy, McCutcheon-Pure 3	1440	2975
WINKLER COUNTY (Scarborough Field)—		
Empire O&R Co., Scarborough 3	437	3020

*Failures; †Junked; ¶Million cu. ft. gas.

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BRUHLMEYER QUIET

Young County wildcat to be given shot of nitro

Wichita Falls, Texas.—Operations in the Bruhlmeyer field, which enabled Cooke County to become the largest contributor of new production in the North Texas district in recent months, have subsided sharply since reduced production allowables went into effect November 1. The field is producing about 3300 barrels daily from 83 wells completed in the 2000-2100-foot sand. On the above date the top allowable per well was cut from 70 barrels to 40 barrels daily. Field work has declined to 9 active operations. Ten dry holes have been drilled. No majors participate in this high gravity oil area.

Yorktex Petroleum Company's F. G. Burnett 1, near center of G. W. Hill Survey A-1444, south central Young County wildcat, flows by heads from broken sandy-lime pay between 3980 feet and 4090 feet. It is expected to make a commercial producer after a nitro shot. The company holds lease on about 1000 acres in the area, which centers about midway between the McCluskey field and Nash & Windfohr's Graham property, and is due west of the Rathke field.

Brazos River Bed Oil Company's Brazos River-Colquitt 1, situated on the south line of Rathke field, averaged 65 barrels of high gravity oil per hour on 48-hour test through tubing from sand at 3944 feet. It is also making about 14,500,000 feet of wet gas daily. The company's second test in the river bed was drilling at 3885 feet, according to late reports, while making about 200 barrels of oil daily after a nitro shot in lime at 3570-3760 feet. If production is developed from the lower sand, owners plan to cement a string of 5½-inch pipe between the two oil zones, and produce from both, as the railroad commission grants an allowable equivalent to two drilled holes when this method of completion is attained in the Rathke field. The production from the upper pay is handled through a bradenhead.

TO AUCTION LAND

Property adjoins leases of University of Texas

Big Spring, Texas.—Sale of 12,960 acres of prospective oil lands in Crane and Ector Counties at public auction in Fort Worth on November 24 has been announced by Will P. Edwards. The tracts adjoin State University lands auctioned in Austin on October 30.

Part of the property adjoins Section 2 in the Gulf-Waddell-Edwards area, where there are seven producers. State lands adjacent to this property brought $52,500 for a quarter section.

The sale will be conducted by Colonel E. Walters, University auctioneer, in the Crystal Ball Room of the Texas Hotel.

Edwards owns the property in fee and will offer five-year term leases. The seven wells now located on the O-4 ranch have a total potential of 58,960 barrels daily, Edwards says.

TEXAS PANHANDLE

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
CARSON COUNTY—		
Phillips Pet. Co., E. Cooper 7	638	3009
GRAY COUNTY—		
Empire O&R Co., M. L. Jackson 3	451	3266
Kewanee O&G Co., M. S. Arnold 10	808	3261
J. S. Morse 9-H	310	2628
Skelly Oil Co., H. Schafer 79	769	3276
HUTCHINSON COUNTY—		
Gulf Oil Corp.-Panhandle Ref. Co., Dial 63	358	3092
Phillips Pet. Co., Garland-Sanford 1, sec 77	¶8.4	2753
J. J. Perkins 8	290	3037
Harry Stekoll et al, Belle Wisdom 3	429	3121
Turman Oil Co.-Plains Pet. Corp., Whittenburg 7	808	2943
U-Tex Oil Co., Ann Ware 5-A	637	3163
MOORE COUNTY—		
Texoma Nat'l Gas Co., W. H. Brown-Gulf 2-G	¶12.9	3133
WHEELER COUNTY—		
C. T. Palmer et al, C. A. Linkey 2	¶8.9	1980
A. Nelson 1	¶55.9	2280

*Failures; †Junked; ¶Million cu. ft. gas.

NORTH TEXAS

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
ARCHER COUNTY—		
L. T. Burns et al, J. D. Carpenter 3-A, sec 89	20	1058
Bert Lowery 4	35	1506
Clark & Mayfield, W. H. Taylor 1, sec 17	*	2502
R. O. Harvey, Jr., et al, A. B. Edwards 2-A, blk 1	*	1334
King Oil Co., W. T. Hutchinson 5, sec 123	*	1389
Russell & Wilson, H. O. Prideaux 20	15	671
Star Drl. Co., Ford 1	*	703
Texas Plains Oil Co., W. H. Terrell 3-A, blk 17	*	1420
COOKE COUNTY—		
Burk Royalty Co., Mrs. C. A. Brown 4	140	2009
Cain & Chandler, J. B. Burch 1	*	2516
Denver Prod. & Ref. Co., Ed Wilson 7	230	2002
Dove Oil Co., J. A. Carr 1	90	1938
Fisher & Moore, Fleitman 1	*	1450
Harper & Knappenberger, Nat Pigott 6	*	1621
Hudspeth et al, Truebenback 2-B	*	1765
Humble, R. B. Poteet 8	6	1694
Rapp, Sledge & Gleason, J. P. Beasley 1	100	2003
Skelly Oil Co., Fields-Bowers 1	*	1820
Whitfield et al, F. C. Owen 5	200	1916
FANNIN COUNTY—		
Sam N. Ball et al, A. G. Ayers-Hercules Life Ins. Co. 1	*	762
Windom Water Works, Fee 1	*	1691
JACK COUNTY—		
Bennett Pet. Corp., Mrs. D. C. Clayton 1	488	3020
Thos. Murphy et al, B Rankin 3	587	2992
Hamilton Pet. Co., F. H. Rhodes 2, sec 2	350	2360
Hill & Hill, CRI&P RR 1	35	3040
Sewell et al, L. G. Burt 1	*	375
MONTAGUE COUNTY—		
Continental Oil Co., N. Howard 5-A	*	1652
Gulf Oil Corp., W. W. Jones 4-B	61	835
Lesh & McCall, R. Cunningham 10-A	11	928
The Texas Co., Cunningham 12-A	32	914
WICHITA COUNTY—		
J. E. Keller et al, Waggoner Bros. 2, sec 11	5	545
Perkins-Cullum Oil Co., Burnett 21, sec 5	20	1346
Pois & Schultz, Foster-Allen 2-A, sec 1	50	1297
Wilson & Ligon, Foster-Allen 3, sec 1	*	1855
WILBARGER COUNTY—		
Lain et al, Mrs. D. Coffee 1, sec 44	*	3506
YOUNG COUNTY—		
E. J. Albrittain et al, F. M. Gilmore 9, blk 14	25	568
Bohner & Gilmore, Prideaux 2-A, blk 15	12	568
S. Caprito et al, Mrs. N. Laquey 1	1500	4045
Grininger et al, Nell Prideaux 3	15	751
Nell Prideaux 4	50	750
Lucky Oil Co. (Cal.), E. M. Shumaker 1, sec 2	*	630
Moran et al, Howard 12, sec 3401	100	918
Panhandle Ref. Co., Prideaux 11	5	766

*Failures; †Junked; ¶Million cu. ft. gas.

Paluxy Producer

COMPLETION MAKES FIFTH WELL IN SULPHUR BLUFF

WEEKLY STAFF REPORT

Mount Pleasant, Texas.—Producing wells in the Sulphur Bluff field, Hopkins County, were increased to five the past week through completion of D. S. Hager, W. P. Luse and Russ Petroleum Company's J. E. Worsham 3, southwest offset to their discovery well, flowing 45 barrels per hour natural through open 2½-inch tubing from the Paluxy sand zone. This new producer logged top of saturated sand at 4476 feet, and drilling was stopped in soft sand section at 4526 feet, or 4093 feet sub-sea. These operators' Worsham 4, northeast offset to the original well for the field, logged Paluxy at 4471-4537 feet, and were preparing to complete late last week. The latter is bottomed at 4094 feet sub-sea. Seven-inch pipe was cemented on top of the sand in Worsham 3, while Worsham 4 cut off a portion of the Paluxy in cementing 7-inch at 4500 feet.

Operations will be started immediately on Worsham 5 and Worsham 7, both located on the north line of the lease.

Hager et al have discontinued spot sales of crude, and their production is being diverted to field storage for the account of the American-Liberty Pipe Line Company. This company is preparing to build a 20-mile 6-inch line from Sulphur Bluff field to Talco, where connection will be made with Humble Pipe Line Company's trunk line system. Walter L. Goldston and Frankel Brothers' H. J. Smith 2, which was recently completed for a northeast extension, is rated as the best well, having averaged 35 barrels of pipe line oil per hour on ½-inch tubing choke for 6 hours from Paluxy at 4458-4519 feet. It is bottomed at 4084 feet sub-sea. Starting of a third test on the Smith 450-acre lease has been delayed pending the delivery of a rotary rig owned by Goldston et al.

Talco Has 112 Producing Wells

Talco field, first Paluxy sand area in Northeast Texas, averaged 7854 barrels daily from 112 flowing and pumping wells during the week ending November 9. The field is prorated to a flat allowable of 75 barrels daily per well, but a few are not able to make their quota, while others are inactive because of salt water intrusion. Recent check-up on the water situation shows 21 producers making from 1 to 60 percent bs&w, and the majority of these are in the closely drilled Talco townsite.

Three concerns are carrying on the bulk of the development work now under way in the Talco area. G. M. W. Oil Company, Dallas, is operating five rigs on as many sites within the townsite. Magnolia Petroleum Company has six rotaries in service, including two of its own and four by contractors. Humble Oil & Refining Company, largest lease owner and producer, is drilling four tests and has derricks up for an equal number, while locations have been authorized for eight additional tests.

Humble Oil & Refining Company's O. L. J. Easter 1, eastern Rains County Trinity test, was drilling below 3100 feet late last week, having logged Pecan chalk at 2181-2462 feet. The Woodbine horizon will not be tested, as Rio Oil Corporation drilled a failure on this 39¾-acre tract in 1934, encountering salt water in Woodbine at 4215-4353 feet, with an elevation of 432 feet.

SULPHUR BLUFF
Commission sets hearing on new East Texas field

Austin, Texas.—A hearing on the Sulphur Bluff field in Hopkins County has been set by the Texas Railroad Commission for November 20 at Sulphur Springs.

At that time, the Commission will hear evidence upon which it may base rules for the spacing, drilling, completion and operation of wells in the field. There are now two producers at Sulphur Bluff.

Producing conditions are similar to those at Talco, in that the oil comes from the Paluxy formation.

WILDCAT TO TEST
Success in Collin County would generate big play

Dallas, Texas.—Northeastern Collin County wildcat of E. A. Parkford, Los Angeles, et al, on the Mrs. W. L. Fagg 38-acre tract, Jas. Rutherford Survey, was scheduled to attempt a test for production late last week after having registered favorable porosity in Paluxy sand section with an electrical formation logging tool at 2672-2771 feet. The instrument was used October 29, and the operators immediately cemented 7-inch pipe at 2655 feet. Successful completion of an oil producer from the Paluxy by this wildcat, which is located about 2 miles northeast of Blue Ridge and near the center of a large drilling block, would stir up a major lease and royalty play for the entire district. Comparatively little trading has occurred since the test reached the Paluxy horizon, but a large gathering of operators and representatives of majors plan to be present when a showdown for production is made. Top of Georgetown lime was logged at 1980 feet, with an elevation of 626 feet.

String of pipe has been ordered cemented in the Collin County wildcat of Port Bolivar Company on the O. G. Durning-Clarkston 140-acre tract, William Creager Survey, to test porous sandy-lime zone logged at 4080-4098 feet. Drill stem tests were unsuccessful. This wildcat is slated to go to 6000 feet. Top of Trinity series was logged at 2110 feet, with an elevation of 722 feet.

TALCO HEARING
Schedule third meeting for considering rules

Austin.—The Texas Railroad Commission has scheduled a hearing on the Talco field, of Titus and Franklin Counties, northeastern Texas, to be held at Mount Pleasant November 21.

This is the third hearing on Talco, and as yet no special rules for operating in the field have been promulgated. At the last hearing, independents urged close spacing, while the major companies asked for a minimum of 1 well to 10 acres. Spacing in the field is now governed by the statewide rule which allows 1 well to 2 acres.

Commission officials said that the method of allocation and the amount of oil to be produced are the questions which operators plan to present at the hearing this month. Since the last hearing, Humble Pipe Line Company has completed a pipe line into the field, and a refinery has been built there. With this additional market, operators are expected to ask higher allowables for their wells.

MAJORS LEADING
Get 24 of 42 East Texas completions

Tyler, Texas.—Majors took the lead in recording the most completions in the East Texas field the past week. With few exceptions, independents have been completing more than 50 percent of the wells each week over a long period. There were 42 completions the past week, and the large companies were credited with 24 of the producers.

Field activity remained unchanged the past week, with a total of 76 rigs in operation. Several weeks have elapsed since the commission has acted on permit to drill applications. A large number of exceptions to the prescribed spacing rule are pending.

EAST TEXAS

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
JOINER AREA—		
Cockburn & Boase, Inc., A Green 14 (82.48-ac)	7500	3808
J. B. Dial et al, Fred Newton 2 (50-ac)	120	3690
Humble, Walter Shaw 10 (76.21-ac)	7000	3784
J. W. Turner 35 (286.52-ac)	7500	3760
Hudnall & Pirtle, Inc., H. J. Patterson 1 (13-ac)	1500	3697
Ohio Oil Co., W. T. Grissom 86 (842.7-ac)	6600	3662
Sun Oil Co., M. M. Burns 9 (109.98-ac)	144	3723
KILGORE AREA—		
Arcadia Ref. Co., E. Samples 16 (101.66-ac)	1500	3784
J. G. Beard et al, J. S. Elder 4 (27.16-ac)	50	3550
Central Commercial Oil Co., King-Shell 6 (44.4-ac)	6500	3688
Delta Drlg. Co., L. Crim 5 (20-ac)	480	3589
Enterprise Oil Co., W. Holt 3 (22-ac)	9300	3625
Gulf, C. E. Christian 29-C (277.85-ac)	9000	3696
S. Hilburn 80-B (172.3-ac)	8400	3542
R. H. Still 20 (188.38-ac)	256	3572
Humble, J. A. Knowles 22 (100-ac)	5200	3638
Harry Schulman et al, M. T. Cole 3	*	3597
Magnolia, R. H. Still 5 (45-ac)	1000	3545
N. Utzman 7 (87½-ac)	60	3545
Nioco Oil Co., J. A. Knowles 6 (7.16-ac)	3000	3558
Shell Pet. Corp., B. F. Laird 27-A (211.31-ac)	9300	3540
Stanolind, N. Radford 3 (19½-ac)	9500	3588
Stewart Oil Co., M. Holt 10-A (103.73-ac)	50	3550
Sun Oil Co., Hilburn-Lloyd 24 (133.7-ac)	3000	3622
Sun-Seaboard Oil Corp., M. T. Cole 49 (266.17-ac)	2400	3537
Texas Canadian Oil Corp., H. J. Thomas 5 (24.94-ac)	3000	3666
H. J. Thomas 6 (24.94-ac)	2500	3700
The Texas Co., S. D. Walker 22 (213-ac)	1000	3594
LONGVIEW AREA—		
Atlantic Ref. Co.-Sun Oil Co., M. Hays 74-A (448-ac)	9600	3574
M. Hays 77 (448-ac)	10,000	3580
Gilcrease Oil Co., J. W. Free 7 (35.95-ac)	7500	3631
Magnolia, H. B. Ziegler 19 (120.62-ac)	9400	3475
Monday Oil Co., T. B. Harris 6-C (60.85-ac)	1000	3506
Selby O&G Co.-Lewis Prod. Co., Snavely 35-B (361.2-ac)	7800	3576
Snavely 13-C (118.3-ac)	4500	3565
Stanolind, A. A. Castleberry 10 (77.44-ac)	90	3586
C. J. Dollahite 7 (41.99-ac)	9600	3696
J. C. & R. S. McKinley 44-B (57.91-ac)	8800	3641
Sun Oil Co., John Hargrove 7 (200-ac)	500	3731
Sun-Seaboard Oil Corp., J. M. Haynes 34 (203-ac)	9000	3622
Tide Water, E. M. Nettleton 17-A (148¾-ac)	6400	3462
John Wrather et al, E. H. Brawley 2 (20.23-ac)	70	3737
LEA COUNTY (Cayuga Field)—		
Tide Water & Seaboard Oil Corp., W. H. C. Goode 4 (906-ac)	2000	4015
FRANKLIN COUNTY (Talco Field)—		
Housh & Thompson, Inc., C. L. Owings 3 (109-ac)	500	4317
FREESTONE COUNTY (Red Lake Field)—		
Red Lake Oil Corp., M. Wheeler 1	¶40	4954
HOPKINS COUNTY (Sulphur Bluff Field)—		
Walter L. Goldston-Frankel Bros., H. J. Smith 2 (450-ac)	1200	4519
TITUS COUNTY (Talco Field)—		
W. B. Hinton et al Hargrove-McLean 2 (20.48-ac)	1444	4308
L. H. Wilson 1 (119.51-ac)	1512	4309
Humble, Mrs. Lucy Blackburn 3 (120.26-ac)	250	4287
A. P. King-Hughes 17 (1053.36-ac)	330	4311
VAN ZANDT COUNTY (Van Field)—		
Pure Oil Co., Mrs. N. R. Blake 5 (78.3-ac)	150	2994
A. G. Maxfield 9 (107.8-ac)	8500	2969

*Failures; †Junked; ¶Million cu. ft. gas.

Lower Coast Active

SOUTH TEXAS IS SCENE OF INTERESTING EXPLORATION

WEEKLY STAFF REPORT

Corpus Christi, Texas.—One wildcat was being completed, while two others encountered showings in the Corpus Christi section of South Texas during the past week. One of the wildcats to show for a possible producer is tied up with a bad fishing job, as a result of losing a portion of the drill stem in the hole.

Gist & Graddy's B. W. Owens 1, Poitevent Survey, Jim Wells County, apparently is providing a 2½-mile northwest extension to the Bentonville field as a result of the coring of a saturated oil and gas sand at 5301-5311 feet. An attempt was made to run a drill stem test, but the drill pipe was dropped after 4700 feet of it had been run into the hole. This likely is the same sand that is producing in the Bentonville district.

White Point Oil Well

In the White Point field, San Patricio County, Callaway, Crosby and Porter's White Point Development Company 1, Seguin Survey, is finally being completed in the 4900-foot sand. It originally drilled to 6511 feet, plugged back, sidetracked, and redrilled to 4914 feet, coring sand at 4900-14 feet. It swabbed 60 barrels of oil and about 40 barrels of salt water, and flow valves are now being installed for final completion. It is expected to revive development in the 4900-foot zone in this field.

Wildcatting in Nueces

The new deep wildcatting campaign southwest of Corpus Christi, in Nueces County, gained further attention during the week, when G. M. Richardson's R. S. Carter 1, Section 8, Laureless Farm Tracts, encountered a gas sand around 3900 feet. The operators now are drilling below 4675 feet. Southwest of this well, Seaboard Oil Corporation and I. J. Allen's J. O. Chapman 1 is developing new water supply after drilling to 3915 feet. Fearis & Cosner's M. L. Stockton 1, also southwest of Corpus Christi, is drilling below 2700 feet. All are contracted to 7000 feet.

Another important wildcat location was staked in Nueces County, Steve Paul et al's Annie T. Smith 1, 330 feet from the south and west lines of Block 27, Section 38, Flour Bluff and Encinal Gardens, 3½ miles south of the Flour Bluff field. It will be of importance from several standpoints. The well is attempting to extend the apparently prolific Flour Bluff field. It is near the Cayo del Oso Creek, a rather large body of water, which may lead to a marine development. It is a direct north offset to the boundary line of the famous King Ranch lease of the Humble Oil & Refining Company, consisting of approximately 1,500,000 acres. This concern will be required to drill its first well on this huge block, should the Steve Paul test be a producer.

Drilling Proceeds

Progress has been rapid on Hooper & Rutherford Inc.'s J. D. Willis 1, wildcat directly offsetting the Eleanor Oil Company's Kline test, San Patricio County. The well is reported to be coring around 6150 feet, but all information is withheld. The Kline test is making hole around 6900 feet. These wells, 2½ miles southeast of Gregory, have been the center of interest for some time.

Another wildcat has been staked in a new play being started near Tivoli, Refugio County. It is Windsor Oil Company's G. W. Bissett 1, John Crockett Survey, 1 mile northwest of Tivoli. Just southeast of Tivoli, Tide Water Oil Company's E. G. Landgrof 1, Collyer Survey, is drilling at 5475 feet.

Continental Oil Company will continue its efforts to complete Austin 1, in the Seadrift area, Calhoun County. After pulling 6⅛-inch casing, it is reconditioning the hole. The well drilled to 8825 feet in the original hole, plugged back, sidetracked, and drilled to 8750 feet in sidetracked hole.

PETTUS DISTRICT

Interest centers around lately started wildcats

Beeville, Texas.—In the Pettus district last week the main interest centered around several new wildcats just started. Several were nearing the possible producing levels.

In Bee County, Devonian Oil Company's Manning 2 had progressed to 2374 feet and was going ahead. The well is 5 miles west of Mineral. Humble Oil & Refining Company's M. M. McKinney 9, 1½ miles southeast of Pettus, has been definitely abandoned at 4141 feet.

Felmont Corporation was reported to have spudded W. Hoff 1, 3000 feet southeast of the Maetze field, Goliad County, discovery well. Sun Oil Com-

pany's Fromme 1, 10 miles north of Goliad, is drilling below 4670 feet in shale.

Ohio Fuel Oil Company has commenced H. J. Rosebrock 1, on the northeast side of the Oakville gas field, Live Oak County. In this same county, Sun Oil Company's J. G. James, 1½ miles west of Mikeska, is drilling ahead below surface casing.

BALCONES ZONE

Several deep wells are seeking Cretaceous oil

San Antonio, Texas.—The Balcones Fault Zone's several important deep wells have progressed to interesting depths and will hold considerable attention for the next few days. These wells are attempting to uncover deep Cretaceous reserves, which, if opened, may be of major proportions.

Having topped the Buda lime at 6705 feet, Paul C. Teas is now drilling ahead below 6850 feet in lime in Clement Vinklarek 1, Millett League, south of Smithville, and on the Bastrop-Fayette county line. The operator expects to pick up the Edwards lime around 7000 feet or shallower. Best available checks on the formations indicate that the well is running several hundred feet higher than normal.

To the northwest, in Burleson County, Red Bank Oil Company's Nellie Gramm 1 is running 3900 feet of 7-inch casing for protection string. The well, bottomed at 5932 feet, was tied up with a fishing job several weeks following the losing of 23 stands of drill pipe in the hole. The pipe finally was recovered, and the well is ready to resume operations.

A third important deep test is Amerada Petroleum Corporation's Halff & Oppenheimer 7, in the Pearsall district, Frio County. The well is now drilling ahead below 5095 feet, and is expected soon to pick up the Austin chalk. Although this is not definitely announced, it likely will carry a directional hole from the top of the chalk, if it should fail to make a large well through straight drilling.

RIO GRANDE AREA

Two 8000-foot wildcats to start in Hidalgo

Mission, Texas.—Contracts have been let and actual drilling will be started immediately on two 8000-foot wildcats recently announced for the southeastern portion of Hidalgo County. Both wells are for the McCollum Exploration Company, one being the James McDougal 1, one mile south of the Pantana Petroleum Corporation's wild gasser, and the other being J. C. Engelman 1-B, 1½ miles southeast of the same wild well.

Hidalgo County's other deep operation, the Union Sulphur Company's American 10 in the Mercedes field, is at 8206 feet and still is cutting out tubing below 5200 feet.

Several other wildcats are making progress in Starr and Hidalgo counties, but all are above 5000 feet.

Laredo.—Humble Oil & Refining Company materially extended the Kohler field of Duval County to the north and established oil production in the Mirando sand with V. Kohler 52-A. The well is in final stages of completion at 2642 feet. It topped the sand at 2613 feet and made a series of drill stem tests, the first three showing a pressure of around 400 pounds with some oil.

The fourth test was made at 2629-42 feet and developed 460 feet of pipe line oil with no pressure in two minutes through three-eighths-inch chokes, top and bottom.

The well is located 990 feet out of the northeast corner of the M. Gussett Survey No. 164.

This new strike further increases the interest in an already important Mirando sand development in the immediate area. Lopez field is located only several miles to the west and Peters field is several miles to the north.

CHANGE WANTED

Propose method for lowering gas output

Austin.—Operators in the Corpus Christi field in Nueces County have requested the Texas Railroad Commission to allow them to produce their wells through the casing rather than through tubing, as a means of reducing high gas-oil ratios.

At a hearing before the Railroad Commission last week, E. O. Buck, independent petroleum engineer from Houston, told the commission that tests he had made indicated that this method of production was the only effective system that would correct this condition. Some wells in the field have gas-oil ratios as high as 68,000/1, according to the schedules issued by the Railroad Commission.

Buck explained that on the west side of the field, the oil sand is so thin that it is impossible to set casing sufficiently low to obtain an effective fluid seal and shut off the gas from the upper formations. When the well is produced through the tubing, the gas soon by-passes the oil and in some instances permits the production of wet gas only.

Tests have been made in which the casing was loaded with oil but the gas still comes through, Buck declared.

His solution to the problem was to produce the oil from the casing through the same size choke that is now used on the tubing. This would allow the accumulation of a larger column of oil in the casing to serve as a fluid seal and increase the pressure on the face of the sand.

Commission officials indicated that they doubted the advisability of such a program, but were inclined to permit a series of tests to be made which might demonstrate its effectiveness.

It is possible that a similar program might serve to reduce ratios in other fields where similar conditions exist now.

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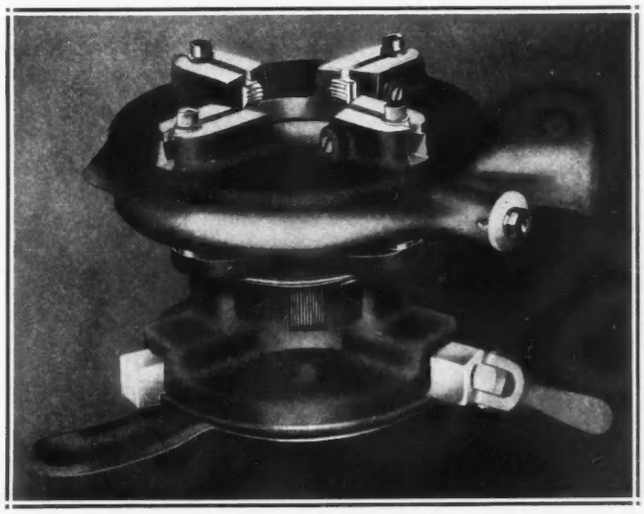

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BEAVER PIPE TOOLS

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SOUTH TEXAS
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
BEE COUNTY—		
Black Dev. Co., Jones 1, 330 ft nl of sur and tr and 1813 ft most westerly el of 286-ac tr in M. Wood sur, ab 41, 5 mi w Beeville	*	5010
Devonian Oil Co., Voss 3, Samuel May sur (Voss)	640	3994
ATASCOSA COUNTY—		
McNeill Pet. Co., Ada Tom et al 1, 2200 ft nel, 2000 ft sel, 640-ac tr W. E. Tom sur, 5 mi ne Whitsett	*	1130
CALDWELL COUNTY—		
Taylor Ref. Co. et al, Branyon et al 1-A, D. Cooper sur (Branyon)	415	2203
KIMBLE COUNTY—		
Wilcox Oil & Gas, Spiller 1, 330 ft n and wl sec 15, ab 80, Brooks & Burleson sur	*	3295
DUVAL COUNTY—		
Atlantic Ref. Co., J. F. Welder heirs 8-C, sur 591 (Seven Sisters)	105	2208
Cox & Hamon, Peters 13, sur 322 (Lopez)	430	2133
W. R. Peters 14 (Lopez)	240	2119
W. R. Peters 34 (Lopez)	360	2167
Humble, McHubberd 49, sur 72 (Loma Novia)	290	2760
Lipscomb & Daubert, W. R. Peters 1, sur 321 (Lopez)	*	2672
Magnolia, Lundell 9, sur 60 (Government Wells)	25	2360
M. G. Peal 23, sec 383 (Lopez)	90	2111
Mortimer & Springer, J. Lopez 8, sur 73, (Lopez)	335	2179
J. P. Peal 8-B, sec 796 (Lopez)	230	2181
Reliance Oil & Roy. Co., Drummon 16, sur 308 (Seven Sisters)	375	2493
Standard of Kansas, Hoffman 6-A, sec 118, (Hoffman)	170	2752
Wellington Oil Co., Welder Heirs 28, sec 383 (Seven Sisters)	625	2453
Westheimer & Daube, Campos 21, sur 224 (Seven Sisters)	290	2722
Campos 22, sec 224, (Seven Sisters)	750	2710
McMULLEN COUNTY—		
Fred Nute et al, W. H. Fahler 1, 1500 ft nl, 700 ft wl 1000-ac farm Geo. Pittuck sur, 4½ mi w Calliham	*	1013
NUECES COUNTY—		
Barnsdall, Weil 1, lot 5, McBride Partition, 3350 ft n Tex-Mex RR, 660 ft w of el, of w 65-ac blk 5, sec 7	*	7502
J. K. Culton, Baldwin 8, blk 19, (Saxet Heights)	390	4082
Hiawatha Oil Co., Morgan 3, sur 405 (Saxet)	575	5846
Smith 3-A, blk 35 (Saxet)	1065	5836
D. W. Powers Prod. Co., Holt & Archer lots 15 and 16 (Saxet Heights)	360	4094
Renwar Oil Corp. & C. Andrade, Fred Frank 2-B, sur 416 (Saxet)	385	5828
Roosth & Genaco, Fee 1, lot 28 (Saxet Heights)	50	4085
Southern Minerals Corp., Frank E. Bliss 3, Stevens sur (Saxet)	540	5832
Westgate Oil Co., Sturm Estate 7, Villareal sur (Saxet Heights)	240	4085
REFUGIO COUNTY—		
Hewitt & Dougherty, Lambert 32, blk 12, (Greta)	2310	5895
Quintana Pet. Co., Tom O'Connor 40-A, Swisher sur No. 5 (Tomoconnor)	2796	5842
United Prod Corp., M. F. Lambert 30, blk 81 (Fox)	860	5878
SAN PATRICIO COUNTY—		
Humble, J. W. Mayo 9, J. W. Ottman sur (Taft)	455	3995
Plymouth Oil Co., E. H. Welder 62-C, tr 3 (Plymouth)	1052	5617
Shell, Pullin 5, blk 1, Taft Farm Lots (Taft)	608	3986
STARR COUNTY—		
Fech Oil Co., Frank Doyno 11 (Rio Grande City)	50	1437
WEBB COUNTY—		
Mills Bennett Prod. Co., Billings 5, sur 113 (Lopez)	240	2222
Smith & Hamill, Benavides 11, blk 367 (Cole)	540	2917
ZAPATA COUNTY—		
Glenn Harroun, Garza Estate 1, blk 10 (Escobas)	75	1263
Nordan & Morris, Haynes 18-A, blk 7 (Comitas)	50	1042
The Zapata Co, Garza Estate 3, blk 20 (Escobas)	150	1209

*Failures; †Junked; ¶Million cu. ft. gas.

Lochridge Proven

GULF'S WILDCAT PRODUCES FROM FRIO AT 6366 FEET

WEEKLY STAFF REPORT

Houston. — Lochridge prospect, Brazoria County, was proven productive November 9 when Gulf Oil Corporation's Wilkes & Smith 2, J. W. Hall Survey, after plugging back from 6456 feet, was completed for 16 barrels of fluid per hour at 6366 feet in Frio formation. The fluid consisted of 27 gravity oil and from 8 to 25 percent wash water. It came through a 3/16-inch choke. Tubing pressure was 1175 pounds; casing pressure, 1700 pounds.

Prior to completion a drill stem test at 6456 feet showed 5500 feet of salt water in 20 minutes through a ¾-inch choke. No pressure was recorded. On a previous drill stem test on Wilkes & Smith 2 at 6347 to 6385 feet, through two ¼-inch chokes, in 15 minutes the wildcat started flowing oil with an 85-pound pressure. The first sand encountered was at 6250 feet, and on a drill stem test from 6318 to 6366 feet the test made 4000 feet of 27 gravity oil with 100 pounds pressure through two ¼-inch chokes. At this depth 14 feet of screen was set. The 2½-inch tubing was hung at 6358 feet for the final production test.

Although several companies have scattered acreage in the vicinity of the discovery well, Gulf Oil Corporation is the major lease holder there. The corporation has made two locations in the newly discovered field.

The pipe line division of Gulf Oil Corporation contemplates a pipe line out of the new Lochridge field if the second test, now projected to the 6366-foot sand, proves productive. At the end of the past week the discovery well was making 18 barrels of pipe line oil per hour.

Gas at 10,460 Feet

Shell Petroleum Corporation's Maco Stewart 1; J. Spillman Survey, Hitchcock prospect, Galveston County, attempted to blow out at 10,460 feet during the past week and forced operators to change blowout preventers. The well showed enough pressure to kick a 14-pound mud out of the drill pipe. The crew increased the weight of the mud to 16 pounds.

After topping the Frio formation, the crew drilled 203 feet into the formation before the gas sand was encountered. Top of the hard sand was found at 10,456 feet. Maco Stewart 1 is the deepest well on the Texas Gulf Coast to show gas below 10,000 feet and is also the deepest well ever to be drilled in the Texas coastal country. The wildcat will be drilled a few hundred feet deeper and then will be plugged back for a production test, if sands are not found at a lower depth.

Several sands have been cored in Maco Stewart 1 from 6050 to 6790 feet and a number of drill stem tests were made. Each test showed salt water. A string of 9⅝-inch casing was set at 7707 feet to protect the hole.

Pan American Production Company completed Craig 2, W. K. Wilson Survey, Gillock field, Galveston County, at 8618 feet in the Frio formation as a gas well. The well was shut in at the end of the week, with a tubing pressure of 3400 pounds and a casing pressure of 1850 pounds. It will remain shut in until surface connections are installed.

Sinclair Prairie Oil Company made location for Weems 1, offsetting Pan American Production Company's Craig 2. Weems 1 is 220 feet from the west line and 220 feet from the south line of a 6.5-acre tract in the W. K. Wilson Survey.

On the northwest side of Dickinson field, Galveston County, Humble Oil & Refining Company was completing Boone 1, W. K. Wilson Survey, in the Frio formation at 8058 feet. At the end of the week the well was flowing into burning pits. Casing was perforated with 19 shots from 8045 to 8052 feet.

Sun Oil Company's Hughes 4, Green Lake field, Galveston County, was abandoned last week at 5005 feet, after coring salt water sands in the Pliocene-Miocene formation. The operators made location for Hughes 5. It is 933 feet southeast along the northeast line from north corner of survey, thence 466 feet southwest at right angles to said line in the W. C. M. Baker Survey.

Hastings Extended

Stanolind Oil & Gas Company extended the Hastings field, Brazoria County, one location northwest last week when F. Brown 1, H.&T.B. Survey, Section 29, was completed in the Lower Marginulina formation at 6080 feet. The test made 362 barrels in 16 hours through a ¼-inch choke. Tubing and casing pressure was 800 pounds.

On the north side of Hastings field, Humble Oil & Refining Company was coring oil sand in Brown 6, W. H. Snyder Survey, at 6125 feet. A gas sand was encountered at 5795 feet and oil sand at 5990 feet. The well will be carried a few feet deeper and then casing will be run for a production test.

Northeast of production at Hastings, Humble Oil & Refining Company made location for Berkhemer 1, 330 feet from the northeast line and 250 feet from the northwest line of a 7-acre tract in the B.B.B.&C. Survey, Lot 10.

Approximately 8000 feet west of production at Pickett Ridge field, Wharton County, H. C. Cockburn's Kaubbla 1 was waiting on cement to set at 4579 feet after running a string of 7-inch casing. Casing will be perforated from 4560 to 4562 feet. A drill stem test at 4705 feet failed to reveal anything of importance. This wildcat was formerly operated by The Texas Crusaders Oil Company.

Magnet Test Shows in Frio

Southeast of Withers field, Wharton County, The Texas Crusaders Oil Company's Fee 1, Magnet area, was flowing by heads at the rate of 128 barrels of fluid daily, 50 percent oil and the rest salt water from the Frio formation at 5560 feet. The oil is flowing into burning pits and is then pumped into storage tanks as fuel oil. On the south side of Withers, The Texas Company completed Pierce Estate C-14, flowing 13 barrels of oil per hour from 5560 feet. In the Five Corners area, Wharton County, The Texas Company's Pierce Estate B-4 was drilling at 5990 feet having passed the regular producing horizon.

On El Campo prospect, Wharton County, Barnett Petroleum Corporation's Bard 1, J. M. Marford Survey, was abandoned at 5555 feet after testing salt water sands in Frio formation.

Felmont Oil Corporation's General Mitchell 1, Spanish Camp prospect, D. Wade Survey, Wharton County, was drilling at 7708 feet, showing gas, at the end of the week.

McDaniel et al's Dye 1, north of production at Van Vleck field, Matagorda County, was abandoned last week at 8733 feet in salt water sand. Top of the water sand was found at 7998 feet. A sand showing oil, gas, and salt water was cored at 7686 to 7692 feet.

Clinton Discovery Well Flowing

Stanolind Oil & Gas Company has announced no new locations for the Clinton field, although one is contemplated soon. The discovery well, Candelari 1, was flowing 120 barrels of 48 gravity distillate daily along with 9,676,000 cubic feet of gas through two ¼-inch chokes. Tubing and casing pressure registered around 2900 pounds. The company has decided to complete Candelari 1 at its present depth, 8101 feet, as it is feared the well may blow out again if an attempt to rework it is made.

B. A. Farrell & J. B. Cox et al announced location for a wildcat test northeast of the Aldine prospect, in Harris County. Bender Estate 1 is 150 feet south and 150 feet east of the northwest corner of the M. W. Travis Survey. It is also west of the Humble field.

Chambers County

Sun Oil Company was waiting on cement to set at 8200 feet in Acom 1, Seabreeze prospect, T.&N.O. Survey, Section 128, Chambers County, at the end of the week. The operators plugged Acom 1 back from 8335 feet to 8100 feet, and set a string of 9⅝-inch casing. The hole was underreamed and a cement plug was set at 8200 feet, to shut off the possible water sands when a production test is made above 8200 feet.

About 1000 feet east of production at Turtle Bay field, Chambers County, Sun Oil Company's Chambers 2 was waiting on cement to set around 7-inch casing, set on top of the oil sand at 6584 feet. The hole is bottomed at 6602 feet. A production test was to be made over the week end.

Another new location was announced in the Cotton Lake area, Chambers County, by Salt Dome Oil Corporation last week. A. B. V. Lawrence 1-A is 1549 feet east of the west line and 350 feet from the north and south line of a 50-acre lease, or 6500 feet east of the west line and 2000 feet south of the north line of the S. Barrow Survey. It is approximately ½-mile west of the operator's Lawrence 2.

On a location west of production at Anahuac field, Chambers County, Sun Oil Company's White 23, J. McGahey Survey, was waiting on cement to set at 7099 feet, after setting 7-inch casing. Depth of the hole is 7125 feet. The crew was to make a production test over the week end.

Humble Oil & Refining Company abandoned nine locations at Anahuac last week. Most of the abandoned locations were edge wells and some were abandoned because of legal entanglements.

Jefferson County

Shell Petroleum Corporation's Carpenter 2 at Nome, Jefferson County, was coring at 6034 feet in sandy shale showing oil at the close of the week. The hole will be drilled to approximately 6066 feet, when 7-inch casing will be run for a production test.

West of Nome field, Sun Oil Company's Long 2, J. Blair Survey, was making approximately 50 barrels of fluid daily, 50 percent oil and the balance salt water from 6066 feet. The fluid was flowing through an ⅛-inch choke. Casing pressure was 300 pounds; no pressure was registered on the tubing.

Sun Oil Company's Long Maubles 1, J. Blair Survey, Jefferson County, was swabbing at 6060 feet at the end of the week. The swab was run to 1600 feet, and the well was showing little oil. No pressure was shown on the tubing, but 140 pounds was shown on the casing.

In the Gilbert Ranch area, northwest of Fannett in Jefferson County, D. B. McDaniels made location for Gilbert Ranch 1 in the J. Record Survey. It is 2266 feet east of the west line and 4198 feet north of the south line of survey.

Southwest of production at Amelia field, Jefferson County, Humble Oil & Refining Company completed Tyrell Combest 1, A. Savary Survey, flowing 74 barrels of pipe line oil daily through a ¼-inch choke. The well was plugged back from 6800 feet to 6780 feet.

J. R. Turnbull's Lutcher Moore 1, northwest flank of Orange field, J. Dyson Survey, Orange County, perforated casing with 150 shots from 6860 to 6920 feet and swabbed salt water during the past week. The operators have plugged back to 6800 feet and will test upper sands, which looked encouraging on an electrical logging device.

In the Ace area, Polk County, Peyton Brothers were building roads to a new wildcat location for Kirby Lumber Company B-1 in the J. S. Thomas Survey, at the end of the week. The operators recently took this acreage from Dick Schwab for a reported cash consideration of $35,000. The well will be drilled to the Cockfield horizon to test sands found productive at Ace. The actual foot measurements are 3650 feet from the east line and 3330 feet from the south line of a 100-acre tract and survey and approximately 1070 feet from Alpha Petroleum Company's Kirby and West Lumber Company B-1.

Sun Oil Company's Lauter 1 on the southeast flank of Clay Creek field, Washington County, was running tubing at 7465½ feet to make another production test at the close of the week. A test was made from 7425 to 7464½ feet in 8 hours and the well flowed gas with no pressure. The test also revealed 400 feet of oil, 140 feet of mud and no salt water. This is the best test the operators have received on Lauter 1. A two-hour drill stem test was made during the past week at 7462½ feet, and it showed four joints of wash water, three gallons of green colored oil on top, no gas pressure, and a slight blow of gas.

HEARING PLANNED

Austin, Texas. — The Texas Railroad Commission will hold a hearing here November 19 to determine whether or not special rules, regulations, and orders shall be adopted for prevention of waste in the Clinton field, Harris County, Texas Gulf Coast.

TEXAS GULF COAST

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
AMELIA—		
Humble, Tyrell Combest 1	75	6794
ANAHUAC—		
Humble, Broussard 2	*	lcn.
Broussard 9	*	lcn.
Grippon 7	*	lcn.
Middleton 25	*	lcn.
Shaver 2	*	lcn.
Tyrell 10	*	lcn.
Tyrell 14	*	lcn.
White B-3 (wo)	216	7126
Zappe 7	*	lcn.
BATSON—		
Gulf Wing 178½	8	245
COTTON LAKE—		
Humble, Howard 1	96	6290
FANNETT—		
Gulf, Thomas 19	435	3815
GREEN LAKE—		
Sun, Hughes 4	*	5005
GOOSE CREEK—		
Humble, Gaillard 52	144	1265
HASTINGS—		
Stanolind, F. Brown 1	552	6080
MANVEL—		
Harrison & Abercrombie, Lewellyn 4	335	5678
Texas Co., Rash 6	154	4120
PIERCE JUNCTION—		
Rio Bravo, Settegast A-16	553	3882
RACCOON BEND—		
Humble, Grawunder C-6	113	4110
Hardy 8-B	*	4165
THOMPSON—		
Robert Eikel, Jr., Hempil 1	140	5408
TOMBALL—		
Humble, Mahaffey 1	50	5567
WEST COLUMBIA—		
Texas Co., Abrams 14	*	4658
WITHERS—		
Texas Co., Pierce Estate C-14	312	5560
BRAZORIA COUNTY—		
Gulf, Wilkes & Smith 2, Lockridge prospect, J. W. Hall sur.	465	6366
HARRIS COUNTY—		
Stanolind, Angello Candelari 1, Clinton prospect, Reels & Trobough sur.	120	8101
WHARTON COUNTY—		
Barnett Pet. Corp., Bard 1, El Campo prospect, J. M. Marford sur.		5555
Texas Crusaders Oil Co., Fee 1, Magnet area, Smith & McKenzie sur	85	5560

*Failures; †Junked; ¶Million cu. ft. gas.

Stanolind Hits

SOUTH JENNINGS PROSPECT YIELDS GAS AND GASOLINE

Lake Charles.—The first strike for Stanolind Oil & Gas Company in the Louisiana Gulf Coast was made November 13, when Calcasieu National Bank 1, South Jennings prospect, Section 15-10s-3w, came in flowing gas and distillate from Oligocene formation at 8648 feet. Latest report from the well states it is making 3,000,000 cubic feet of gas daily and 5 barrels of gasoline per hour through 3/16-inch choke, with a tubing pressure of 3200 pounds. The casing is sealed. This new strike has one of the highest pressures ever recorded in the Louisiana Gulf Coast.

It is Stanolind's first wildcat in South Louisiana. Including the Texas and Louisiana Gulf Coasts, the operators have drilled seven wildcats and each one has opened a new producing area.

Calcasieu National Bank 1 during the past week had 9⅝-inch casing set at 8900 feet and perforated from 8634 to 8648 feet with 29 holes. On a drill stem test a 500-pound gas pressure was recorded along with a good blow of gas and 45 feet of mud cut with distillate.

Stanolind Oil & Gas Company discovered the South Jennings prospect in 1935 with reflection seismograph and torsion balance. After working the area with geophysical instruments the company leased around 8000 acres. Shell Petroleum Corporation has considerable acreage in the area, as do several other major and independent operators.

The South Jennings strike is the third strike in the Louisiana Gulf Coast the past year. Bayou Mallet in Acadia Parish, and Charenton field, St. Mary Parish, being the other two strikes.

Mallard Bay 11,000-foot Test

Pure Oil Company's State Mallard Bay 1, Mallard Bay prospect, Section 22-13s-3w, Cameron Parish, is projected to 11,000 feet or deeper. If this depth is reached, the test will be the second 11,000-foot well in the Louisiana Gulf Coast. The first was Continental Oil Company's Hebert 1, Abbeville prospect, Vermilion Parish, which blew out at 11,732 feet.. After sidetracking at 10,790 feet Hebert 1 was drilling in shale at 10,940 feet at the close of the week.

Before State Mallard Bay 1 was spudded in the operators had planned to go to 11,000 feet. If no encouraging sands are encountered they may go to 12,000 feet and establish a new deep drilling record for the area. Twenty five-inch conductor pipe was set at 85 feet, a string of 18⅝-inch casing was cemented at 1499 feet and 13⅜-inch was set at 4604 feet. After drilling to below 9000 feet a string of 7- or 9⅝-inch casing will be set for protection.

At the end of the week the test was drilling in sandy shale below 5990 feet, after coring several sands showing oil, gas and salt water below 5700 feet. At 5869 to 5874 feet, a sand with an odor of oil was cored, but it carried salt water, and from 5874 to 5876 feet the same kind of sand was cored. Mallard Bay 1 has cored sands at different levels which had good odors of oil and gas but each section has been very thin and underlying the shows salt water sands were encountered.

English Bayou Extended

On the southwest side of English Bayou field, Calcasieu Parish, Fohs Oil Company's Castle 15, Section 13-9s-8w, was completed in Marginulina sands at 7042 feet. The extension test came in flowing 200 barrels daily through a 14/64-inch choke, with a tubing pressure of 1900 pounds and a casing pressure of 2200 pounds.

East of production at English Bayou, Union Sulphur Company's Kaufman 1, Section 13-9s-8w, was drilling in shale at 7405 feet at the close of the week in search of a new producing horizon. This company recently extended the field and found a new producing sand at 7374 feet.

On the northwest side of Tepetate, Acadia Parish, Continental Oil Company's Homeseekers 7-A, Section 29-7s-2w, was waiting on cement to set at 8391 feet, where seven-inch casing was set. This depth is considerable lower than the regular producing sands at Tepetate.

Northeast of production at Tepetate, Continental Oil Company's Veronie 1, Section 28-7s-2w, flowed 216 barrels of 34.1 gravity oil daily through a 5/32-inch choke from Marginulina-Frio sands at 8306 feet. Tubing pressure on Veronie 1 was 1000 pounds; casing pressure, 1200 pounds.

On the west side of Tepetate, Continental's Young B-1, Section 29-7s-2w, was completed at 8316 feet. The well came in flowing 134 barrels of 45.1 gravity oil daily through a 3/16-inch choke with a casing pressure of 2500 pounds and a tubing pressure of 2250 pounds.

Two New Prospects Discovered

Two new prospects were discovered in the Louisiana Gulf Coast recently and three wildcat locations made on them will be announced before the end of the year. Black Prince Island prospect, south of Lake Des Allemands, La Fourche Parish, has been worked with geophysical instruments and the "high" is reported to center around the middle of the island. It is reported that a major oil company spent over $75,000 getting water leases in this area from the state. A location made on the island has not been given out. The second prospect discovered recently is the Golden Meadows prospect, approximately 12 miles north of Leeville field in La Fourche Parish. After working the area with reflection seismograph and torsion balance, The Texas Company took over 5000 acres. Half of the acreage was taken from the Louisiana Land & Exploration Company. Locations for this prospect will be announced within a few months.

John Cartwright's Nunez 1, east of New Orleans, Section 10-13s-12e, St. Bernard Parish, was abandoned at 6621 feet in shale last week. An electrical logging device run to 6477 feet showed a little reaction around 5000 feet.

At Fausse Point, The Texas Company's State Fausse Point 2, Section 35-11s-8e, Iberia Parish, has been showing heavy gas pressure at 6314 feet. An electrical logging device was run in the hole and then it was used for geophysical work. Plans are to drill the wildcat deeper.

The discovery well at Charenton, St. Mary Parish, is being worked over. Mike Hogg's Lawes Realty Company 1, Section 30-13s-10e, was killed because it showed from 5 to 25 percent salt water. The crew will make a new setting to eliminate the water. Southwest of the discovery well, Mike Hogg's Bayou Teche 1 was running an electrical logging device below 8000 feet after failing to find any sands of importance while drilling. It is believed the hole will be abandoned.

West of Charenton field, Herton Oil Company made location for Roanes 4. It is 500 feet northwest of Roanes 3 and 500 feet southwest of Roanes 2 being in Section 40-13s-9e.

The Texas Company is seeking deeper production at Lake Barre, Terrebonne Parish, where a new depth record for the field has been established by State Lake Barre 37, Section 30-21s-20e. During the past week the deep test was down to 7948 feet with a stuck drill stem. Operations will be resumed as soon as possible. Heretofore, the deepest well drilled at Lake Barre was The Texas Company's State Lake Barre 22, abandoned at 7162 feet in March, 1934.

20 LOUISIANA PERMITS

Shreveport.—Twenty drilling permits were issued last week by the minerals division, Louisiana Conservation Commission, including 5 renewals, all the latter being in the Rodessa field, Caddo Parish.

Twelve issued for North Louisiana were divided among the following parishes: Bienville 1; Caddo 7, of which 6, including 5 renewals, are for Rodessa; DeSoto 1; Grant 1; Ouachita 1; and Webster 1.

Those in south Louisiana were divided among the following parishes: Avoyelles 1; Acadia 1; Calcasieu 1; Concordia 1; Iberville 1; La Fourche 1; St. Martin 1; and St. Mary 1.

SOUTH LOUISIANA Completions

Company, Well and Location	Init Prod. Bbls.	Depth
ENGLISH BAYOU—		
Fohs Oil Co., Castle 15	167	7128
NEW IBERIA—		
Wm. Hellis, Boliver 4	450	3966
TEPETATE—		
Continental, Veronie 1	232	8307
Young B-1	201	8316
WEST HACKBERRY—		
Stanolind, Carter-Sweeny 5	1008	3909
ST. BERNARD PARISH—		
John Cartwright, Nunez 1, e of New Orleans, 10-13s-12e	*	6621

*Failures; †Junked; ¶Million cu. ft. gas.

Rodessa Is Active

EDGE TESTS ARE INCLUDED AMONG 89 DRILLING WELLS

NORTH LOUISIANA

WEEKLY STAFF REPORT

Shreveport, La. — Possibility of a two-mile northwest extension of the Rodessa field, north of a supposed lateral fault running off the main Rodessa Fault, appeared last week. Bay Oil Company of Tulsa, after cementing 7-inch casing at 6107 feet, with total depth of 6121 feet, in George Parker et al's G. Crowder A-182 Survey, Cass County, perforated casing at the Gloyd sand level at 6019 to 6026 feet with 20 shots, and began swabbing. The well yielded oil and drilling water, and was swabbed down to within 1000 feet of the bottom, with that amount of fluid still in the hole after several hours of swabbing.

This test logged first anhydrite stringer at 5198 feet, massive anhydrite from 5473 to 5728 feet, base of anhydrite stringer at 5823 feet, the Hill horizon from 5660 to 5681 feet, and the Gloyd from 5981 to 6042 feet. Elevation is 237 feet.

Outpost Test Coring

A half mile northeast outpost test at Rodessa, Idessa Oil & Gas Company's Sumner 1, NW SW SW 10-23n-15w, was coring below 6186 feet, after several electrical tests.

Texas Side Drilling Heavy

Last week there were 89 tests drilling in Rodessa, of which 63 were on the Texas side of the field and 26 on the Louisiana side. Besides this there were 26 active rigs, derricks and locations on the Cass County, Texas, side and 3 on the Caddo Parish side. United Gas Public Service has the most drilling wells in the field, with 27 drilling, including 15 in Cass County and 12 in Caddo Parish.

Twenty-five new locations were announced last week on the Cass County side of the field, including 20 by United Gas. These 20 include G. W. Bibby 5 to 8, inclusive, Alex Archer Survey; J. O. Clement 1 to 4, inclusive, W. B. Hughes Survey; Bivens Unit 1 to 9, inclusive, James Davenport Survey; Robert Bauguss 1 and 2, Alex Archer Survey; Rambo 7 and 8, James Davenport Survey; and Tyson A-4, J. H. Rives Survey. Magnolia Petroleum Company made four locations: Thornton Heirs 1, Wilson Robinson Survey; G. Hill 2, C. E. Lear 2, and Noel Estate 2, all in the W. B. Hughes Survey.

Rodessa had one of the quietest seven-day periods in some time in number of completions, only 5 new wells having been completed and gauged. Another, Gulf Oil Corporation's Dawson 1, J. H. Rives Survey, was completed at 6006 feet, but is waiting on gauge.

Tide Water Oil Company's Sexton 13, Section 14-23n-16w, on the lease secured from Pelican Oil & Gasoline Company, was recompleted at 6066 feet, flowing 114 barrels in 24 hours through ½-inch tubing choke, with tubing pressure 700 pounds and casing pressure 900 pounds, making 6 percent salt water.

R. W. Norton's J. E. Payne 1, SE SE 27-23n-16w, south of Rodessa oil production, a proposed 10,000-foot test, is drilling below 4000 feet. J. Edward Jones' Madie Sharpe 1, SW NE SE 4-23n-16w, 1 mile north of production, is drilling below 5500 feet.

New Gas Line

United Gas Public Service Company is building a 12-inch gas line from its plant at Myrtis to Eastern Texas Production Company's Rodessa townsite plant. Eastern Texas is now connected to some of the townsite wells.

As the well is showing only gas at 6095 feet, The Texas Company is killing McLeod 1, W. A. Elliott Survey, preparatory to deepening. United Gas Public Service Company was preparing to set final string of casing in Bewley 1, H. Holbert Survey, total depth being 6000 feet. This is an offset to Superior Oil Company's Susie B. Chatten, William R. Meyers Survey, southwest outpost producer.

The ¾-mile west outpost test of Eastern Texas Petroleum Company at Belote 1, Charles Ames Survey, set 9⅝-inch casing at 1989 feet. The 1-mile west outpost of H. L. Hunt, at Shelton 1, James Davenport Survey, is ready to set final string of casing. M. H. Overlees is ready to spud Lizzie Henderson 1, R. Bennington Survey, Marion County, 3 miles north of Jefferson. Deep Rock Oil Corporation is taking leases in the vicinity of this test, an area where Fohs Oil Company is also active.

RODESSA HEARING

Will discuss oil and gas ratio November 19

Shreveport.—Governor Richard W. Leche and Conservation Commissioner William G. Rankin of Louisiana have set 11 a.m. November 19 as the date for a hearing on a permanent gas-oil ratio order for the Louisiana side of the Rodessa field. The hearing will be held at Baton Rouge.

The present gas-oil ratio, promulgated for a 30-day period and continued in effect since that 30 days expired October 15, holds oil wells to a ratio of 12,500 to 1 and distillate wells to 25,000 to 1.

Governor Leche was quoted as saying that he was not yet satisfied with conditions at Rodessa, and unless operators co-operated in correcting conditions there he would send militia to see that the state's regulations were enforced.

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SLIGO PRODUCER

Too far up on structure and yields only wet gas

Shreveport.—Proving that it was too high on the structure, United Gas Public Service Company's Roos 1, Section 23-17n-12w, Bossier Parish, Sligo gas field, when tested last week through 6-inch casing for 30 minutes, showed 12,240,000 cubic feet of wet gas. Total depth is 5209 feet in the Petitt sand of lower Glen Rose. If taken as a gasser it will be the fifth Petitt sand gasser in the field.

This well is one-fourth mile northeast of the same company's Skannal F-1 in the same section, completed recently in Petitt sand at 5201 feet as the field's first oil well. That well is now making 96 barrels of oil daily through ¼-inch tubing choke.

On the northeast edge of the field, Arkansas-Louisiana Gas Company apparently has given up the idea of going to the Petitt horizon in McDade 1, Section 8-17n-11w, having cemented 7-inch casing for test of the 4200-foot regular producing horizon at Sligo.

DEEP WILDCAT

Travis Peak is objective of Claiborne Parish test

Shreveport.—Location was made last week for a proposed 6100-foot test which will go well into the Travis Peak of the lower Trinity. Max Hirsch and associates of Cincinnati, Ohio, propose to drill C. O. Ferguson 1, NW SW 29-22n-6w, Claiborne Parish, 7 miles northeast of the shallow Homer oil field, which was discovered in 1919 and which produces from the Nacatosh and Blossom horizons.

Base of the anhydrite is expected around 4200 feet. Materials are moving in.

The location is on a block of 10,000 acres, assembled by Con. F. Leue. The geology was done by H. D. Easton of Shreveport. The well site is at what is believed to be the intersection of two folds or a fault and a fold, the main fault extending northwest and the other fault extending along the northeast part of the shallow Homer field.

DeSoto Parish Test

The Julian-Igoe Syndicate of Shreveport announced location for Hallie Smith 1, SE SE 31-14n-15w, DeSoto Parish, a 3000-foot test, which will be drilled so that it can be taken deeper. It is on a block of 4200 acres. The same syndicate has a 2000-acre block in Township 12 north, Range 16 west, on which a test is planned next spring.

Sherrouse and Snyder are moving in materials for a 4500-foot test on a 20,000-acre block in Franklin Parish. The test is Kimble 1, center SE SW 36-12n-8w. The geology was done by Dr. A. F. Crider of Shreveport.

Leasing Activity

Near a large block held by Standard Oil Company of Louisiana in Township 18, Ranges 6 and 7 west, Bienville Parish, Lion Oil Refining Company is leasing, and in this same general area Magnolia, Phillips, Standard of Louisiana and Mid-Continent Petroleum Company have shooting crews. Gulf is preparing to send one or more crews into Caldwell Parish around Townships 11 and 12 north, Ranges 4 and 5 east, to do seismograph work.

In Franklin Parish, Wallace Blocker is leasing in Townships 14 and 15 north, Ranges 7 and 8 east. Mid-Continent Petroleum Company is adding to its holdings in Township 11 north, Range 14 west, DeSoto Parish. Tri-State Leasing & Development Company is planning to core drill a block it holds in Grant Parish, in Township 7 north, Range 3 west. Sun Oil Company, Magnolia Petroleum Company, Leon Johnson and W. E. Curtis are leasing around the shallow Converse field, in Townships 13 and 14 north, Ranges 9 and 10 west. P. J. O'Brien is leasing in Township 23 north, Range 10 west, Webster Parish. Magnolia and Phillips Petroleum Company have geophysical crews in Webster Parish.

Shreveport, La.—Bay Oil Company's George Parker 1, G. Crowder Survey, Cass County, Texas, 2 miles northwest of Rodessa field production, Friday was reported swabbing 4 barrels of net oil per hour with considerable drilling water after 7-inch casing had been perforated at the Gloyd horizon at 6019-26 feet. Due to lack of pressure, the operators were considering installation of lifting equipment. They also started work on tankage.

THIRD DEEP TEST

North Louisiana now has another 8000-foot well

Shreveport.—North Louisiana secured its third 8000-foot operation last week, when Gulf Oil Corporation's R. R. Rhymes 15, SE NE Section 32-17n-6e, Richland Parish, passed that level. The well is drilling below 8060 feet. Other tests in North Louisiana going below that level have been Ohio Oil Company's R. L. Holloway 6, Section 23-21n-10w, Webster Parish, Cotton Valley field, which plugged back and completed as an oil well at top of the Travis Peak at 5550 feet, and Sugar Creek Syndicate's Darrett 2, Section 31-20n-5w, Claiborne Parish, now fishing at total depth of 8615 feet, the depth record for North Louisiana.

4 ARKANSAS PERMITS

El Dorado, Ark.—Four drilling permits were issued last week by the Arkansas Board of Conservation as follows:

Nevada County: Benedum & Trees Oil Company, Pittsburgh, Pa., Grove Land & Timber 2, 300 feet south and west NE SW NW 10-14-20; Grove Land & Timber 3, located 330 feet north and east SWc SE NW 10-14-20.

Ouachita County: J. D. Reynolds, Camden, Arkansas, Lenehan 2, NW SE SW 36-15-16.

Clark County: John G. Wooten, Prescott, Arkansas, Z. T. Sparkman 1, located 660 feet south and east NWc NW 1-11-20.

STATE GETS WELL

Fee 5, Jackson gas field, yields 40 million feet

Jackson, Miss.—State of Mississippi's Fee 5, located 250 feet west and 330 feet north of center NE½ 25-6n-1e, Hinds County part of the Jackson gas field, was completed at 2493 feet as a 40,000,000-cubic-foot gasser. Elevation is 341 feet; top of the Midway black shale was logged at 2390 feet, and top of the chalk at 2488 feet.

Snow Black Petroleum Company is planning another test in Jones County, south Mississippi. Location probably will be about four miles north of Fox 2, Section 31-7n-12w, temporarily abandoned at 4200 feet.

BIG BLOCK TAKEN

Arkansas gets good play of leasing and shooting

El Dorado, Ark.—McAlester Fuel Oil Company of McAlester, Oklahoma, has taken a block of 4500 acres located in Township 18, Range 27, Miller County, Arkansas, and is reported considering a 6000-foot test.

In Calhoun County, Phillips Petroleum Company is reported renewing leases on a block in Township 14, Ranges 12, 13 and 14, and in Hempstead County, in Ranges 11, 12, 23 and 24, David Beamer of Shreveport is assembling a block.

In Columbia County, Standard Oil Company of Louisiana has a geophysical crew working in Townships 15 and 16, Ranges 22 and 23, and in Bradley County, Tidewater Oil Company has a seismic crew at work. Phillips Petroleum Company's crew continues to work south of Fulton, Hempstead County.

Benedum & Trees Oil Company's Grove 1, SW SW 10-14-20, recently standardized, is pumping 30 barrels per hour, two-thirds of the fluid being oil.

ARKANSAS

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
HEMPSTEAD COUNTY—		
Hays et al, State of Arkansas 2, 18-14-25	*	3150
LONOKE COUNTY—		
Frank F. Silver, Jos. Chambers Est. 1, 17-2n-7w	*	1623

*Failures; †Junked; ¶Million cu. ft. gas.

NORTH LOUISIANA

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
BOSSIER PARISH—		
Humphreys et al's (formerly Geo. Bringhurst) Bulkley Est. 2, 35-21n-13w	*	3025
CADDO PARISH (Rodessa)—		
Louisiana Oil Ref. Corp. (Ar-La Gas Co.) Ratcliff 4, 16-23n-15w	1800	6045
United Gas Pub. Serv. Co., Rodessa 25, 22-23n-16w	1800	5997
CASS COUNTY (Texas-Rodessa)—		
Magnolia Pet. Co., George Est. 5, John Collum sur	2000	6080
Showers & Moncrief, Stallcup 5, Robt. Trammell sur	1800	5994
United Prod. Corp., Stewart 7, John Collum sur	1500	6050

*Failures; †Junked; ¶Million cu. ft. gas.

Hidden Dome Busy

FAVORABLE DEVELOPMENTS RECORDED IN SMALL FIELDS

ROCKY MOUNTAIN FIELDS WEEKLY STAFF REPORT

Casper, Wyo.—Hidden Dome field in Washakie County, northern Wyoming, led the drilling activities for the week with three excellent completions and another well near completion.

Yale Oil Corporation's Government 1, SE SE SE 25-48n-91w, was completed for 135 barrels of oil from 1561-83 feet. The latter is also the total depth of the well.

Wyoming Oil & Refining Company's Government 4, NW NE NW 31-48n-90w, flowed 75 barrels in the first 24 hours from the Frontier sand topped at 1524 feet.

The third completion in the Hidden Dome field this week was Nystrom & Smoot's State 3, NE NE NE 36-48n-91w, which made 106 barrels oil in the first 24 hours. Production is from the Frontier sand. The producing sands were topped at 1577 feet.

Dr. R. C. Jeffries and Cahoon's Government 1, SW NE SW 30-48n-90w, is a near completion in the Frontier formation at 2212 feet. The first Frontier sand was topped at 2128 feet, with a good oil and gas show with no water. The well is located nearly a mile northwest of the main developed section of the Hidden dome field, and despite checking about 500 feet lower structurally, the absence of water with the oil and gas shows indicates a probable extension of the field in that direction. Saturation was cored at 2110 feet, at which point the 6⅝-inch production casing will be set.

Four other wells drilling in the field are now drilling below 1000 feet, while a fifth test on the northwest side of the field is rigging up cable tools and preparing to spud.

In the Osage field, Weston County, eastern Wyoming, drilling activities were at a new high this week as 4 completions, 2 of which were dry holes, were made, and 2 new wells were reported.

The two producing completions made in the Osage field are producing from shale formations at depths of less than 400 feet. The largest completion is H. W. Wiltse's 11, NE NE NW 17-46n-63w, which is flowing 95 barrels daily from a stray sand in the shale at 265 feet total depth.

Bert Higgin's Fee 4, W NW SW 4-46n-63w, pumped 30 barrels initial from a depth of 287-288 feet. Bottom of the hole is at 385 feet.

C. D. Stough's 4, W SW NW 4-46n-63w, was dry at a depth of 314 feet and was plugged and abandoned at that depth.

Two new wells in the field are rigged up and starting drilling operations. C. D. Stough's 5, S SW NW 4-46n-63w, is drilling at 50 feet. A. E. Jones' 14, NW SW NE 21-46n-63w, is drilling at 275 feet.

Tri-State Area

Mountain Fuel Supply Company has 3 wells near completion in the Tri-State area, which embraces adjoining sectors of Wyoming, Colorado and Utah, this week. Company's Georgia Kuykendall, NE NE SE 22-12n-100w, in the Hiawatha field, Moffat County, northwestern Colorado, is cleaning out and testing at 2766-74 feet.

Company's Carl Allen 1 made a small head of 20 barrels of light oil from the Wasatch sand at 5012-30 feet, and is cleaning out, preparing to test at this depth. The well is located in the Hiawatha field, Moffat County, in the NE SW 32-12n-97w.

In the Clay Basin field, Daggett County, northeastern Utah, Mountain Fuel's State 1, NW NE 17-3n-24e, is preparing to complete in the Dakota at 5740-5936 feet after plugging back from the Morrison encountered at 6165 feet, dry.

Northern Wyoming

Drilling operations in the Garland field, Big Horn County, northern Wyoming, showed rapid progress during the week. Peter Evanoff's McAllister 1, on Lot 40, NW NE SE 3-35n-97w, is shut down at 3015 feet, preparing to pull the 6¼-inch casing landed at 2747 feet. Well will be drilled to the Madison lime, major objective at the Garland field.

The Stock Oil Company's 2-X Allen, 190 feet to the northwest of company's Allen 1, SE NW SE 35-55n-97w, on the Garland anticline, is drilling at 1620 feet. Well is being drilled as a directional hole to kill the 60,000,000 cubic foot gas flow coming from the Allen 1 well. The Rocky Mountain Drilling Company is drilling the directional hole.

Company's Griffin 1, NE NE NE 4-55n-97w, Garland, is drilling at 3832 feet.

On the South Garland Fault Block, Big Horn County, Wyoming, the Peay Oil Company's (Crosby & Huntington) Denio Mining & Milling Company 1, C NE NE NE 15-55n-97w, is drilling at 3930 feet. First objective of the well is the Peay formation.

Expected completion of the Continental Oil Company's Schuricht 2-B, SE SW SE 6-35n-65w, Lance Creek field, Niobrara County, eastern Wyoming, was delayed this week when the well encountered water with the oil in the fourth Sundance sand at 3962-4049 feet. Operators are plugging back to the Third Sundance sand logged at 3823-90 feet. Total depth of the hole was 4068 feet, which was 19 feet in the red beds. The well is in the southern end of the Lance Creek field.

A. B. Cobb and the Holly Development Company are fishing for drill collar lost at 3591 feet, in their Nat Novick 1, NE SE SW 6-35n-65w.

The Ohio Oil Company has 2 wells near completion in the Lance Creek field. Both are drilling below 3000 feet and nearing the producing horizons of the field. Company's Agnes Rohlff 4, C SW NE 32-36n-65w, is drilling at 3507 feet, and Carrie Putnam 6, C NW NW 4-35n-65w, is drilling at 3395 feet.

On the Jay Em structure, approximately 70 miles to the south and east of the Lance Creek field, the Ohio Oil Company's Joseph A. Waggoner 1, C NE NE 14-28n-63w, in Goshen County, eastern Wyoming, is drilling in red beds at 1910 feet.

Central Wyoming

Sinclair-Wyoming Oil Company's Muskrat 2-C, deep test well on the Muskrat gas structure, Fremont County, west central Wyoming, is still waiting on engine repairs necessary, delaying a production test of the Embar formation at 7268-93 feet. Saturated cores were recovered from Embar.

Drilling activities throughout the state of Montana were slowing this week as the advance of cold weather announced the close of the drilling season for this year.

In the Devils Basin field, Musselshell County, Montana, George Gregory et al's 1, NW SW NW 25-11n-24e, is drilling at 465 feet in the Quadrant lime.

On the Hatfield Gas structure, Carbon County, southern Wyoming, Ohio Oil Company is testing the Dakota formation at 3933 feet after a cement squeeze job at 3903 feet on the 6¼-inch casing to shut off water from above. Total depth of the well is at 3950 feet in the Dakota.

MOUNTAIN STATES Completions

MONTANA

Company, Well and Location	Init. Prod. Bbls.	Depth
GLACIER COUNTY (Cut Bank Field)—		
Texas Co., Tribal 5-122, lot 10, 5-32-5w	73	2932
TOOLE COUNTY (Kevin-Sunburst Field)—		
Coolidge & Coolidge, Haskins 1, sw se sw 25-36-2w	30	1630
Fred Munger, Peterson 1, nw nw se 8-35-3w	*	1654
Stanley Gray Aronow 2, cwl nw sw 12-35-3w	84	1546
TOOLE COUNTY (East Cut Bank Area)—		
Parr Oil Co., Reynolds 1, sw ne nw 31-34n-4w	*	2685

NEBRASKA

GRANT COUNTY (Hyannis-High)—		
Byrd Frost, Inc., and Magnolia Pet. Corp., Abbott 1, ne nw 22-24n-38w	*	4040

WYOMING

ALBANY COUNTY— (Quealy Dome)—		
California Co., Holst 4, se se se 13-17n-77w	70	3452
BIG HORN COUNTY (Byron Field)—		
Ohio Oil Co., Irene Lindsay 1, cnw se 25-56n-97w	486	5177
NIOBRARA COUNTY (Lance Creek Field)—		
Continental Oil Co., Emil Rohlff 1, csl se nw 32-36n-65w	50	3967

*Failures; †Junked; ¶Million cu. ft. gas.

Rework Discovery

PRODUCTION DROPS TO 130 BBLS. IN WILMINGTON TEST

WEEKLY STAFF REPORT

Los Angeles. — General Petroleum Corporation's Terminal 1, Wilmington, was completed November 2 on a temporary production test pumping 195 barrels a day of 28 gravity oil cutting 60 percent fresh water and mud. On November 3, production had dropped to 130 barrels a day cutting about 30 percent fresh water with occasional slugs of mud. The gas production was 100,000 cubic feet carrying 3 gallons gasoline per 1000 cubic feet. Rods and tubing have been pulled and the liner will be thoroughly washed before continuing the production test.

Location of Terminal 1 is north of Terminal Island in the Los Angeles Harbor district at the south edge of Wilmington, in Section 4-5s-13w. Depth is 6814 feet, bottomed in schist, and plugged to 5510 feet. A 4¾-inch combination string, including 200 feet perforated on bottom and with a left-hand nipple at 3631 feet, was landed on the plug at 5510 feet and cemented through perforations at 5310 feet. Prior to being placed on the pump, the well was swabbed and flowed by heads. Efforts to induce continuous flow were unsuccessful.

Gauthier Oil Company's Classification Yards 1, Section 27-4s-13w, two miles northeast of General Petroleum Corporation's Terminal 1, above, was cored to 3765 feet in dark brown, unsorted, well saturated oil sand. The 6⅝-inch water string was set at 3592 feet and is standing cemented. This well is reported to have more oil sand than adjoining wells although it correlates 300-400 feet lower. This is the most northeasterly well of the Wilmington area, and its completion will prove up a large area to the south and west.

Water at DiGiorgio

In the DiGiorgio area, 15 miles southeast of Bakersfield, Mohawk Petroleum Company's Earl Fruit 2 was being swabbed for production when water broke in. While running a water locater, the well started to flow through the casing at the estimated rate of 100 barrels a day of 36 gravity oil cutting 2 percent. The source of water was not located and no explanation of the well's behavior is offered. Depth is 6164 feet in schist, with 6⅝-inch water string cemented at 6070 feet. The well is located in Section 10-31s-29e, about 660 feet west of Mohawk Petroleum Company's Earl Fruit 1, the discovery well of this seeming southeasterly extension of the Mountain View oil field.

Shell Oil Company's Greer 1, located in Section 15-31s-29e, about 1 mile south of Earl Fruit 1, above, started to flow when swabbed for a production test. Production consisted of from 3,000,000 to 4,000,000 cubic feet of gas, with some water and a scum of oil. Flow was through a ⅞-inch choke, with tubing head pressure of 100 pounds. Top of the schist was cored at 6151 feet and the hole was bottomed at 6171 feet. The 5¾-inch water string is cemented at 5720 feet, and 465 feet of 4-inch liner, including 441 feet perforated, is landed at 6148 feet.

Standard Oil Company has erected derrick for McDonald Island 2. Location is 2970 feet north and 4122 feet east from McDonald Island 1, drilled to 4500 feet and abandoned last May without developing production of any consequence. This location falls in Section 19-2n-5e, about 17 miles north of the Tracy gas field and 12 miles northeast of Stockton.

Buena Vista Outpost Dry

Ohio Oil Company's K. C. L. B-1 was drilled to 5627 feet and abandoned. Numerous formation tests made as drilling progressed, failed to indicate commercial production. The well is located in Section 4-32s-26e, about one mile southeast of the Buena Vista gas field and eight miles south of the Ten Section oil field. A southeasterly extension of the gas field was expected.

In Fruitvale field, six miles west of Bakersfield, H. L. Whiston's Turner 1 was completed November 5 flowing 1200 barrels a day of 22 gravity oil cutting four percent. The well is being choked back and present production is about 600 barrels a day of 22.1 gravity oil cutting 0.1 percent. Depth is 3150 feet, with 8⅝-inch water string cemented at 3098 feet, and 70 feet of 6⅝-inch liner, including 50 feet of 120 M. perforations, landed on bottom. Location is 150 feet north and 810 feet east from C NW Section 23-29s-27e, at the northeast edge of the field.

Midway-Sunset field in southwestern Kern County was the scene this week of four new completions, three of which were far in excess of expectations. Gibson Oil Company's Francis 2, Section 6-11s-23w, was completed flowing 1200 barrels a day, Merritt Annex Oil Company's Fried 2, Section 25-12n-24w, was completed flowing 600 barrels a day, and South Cerritos Oil Company's South Cerritos 3, Section 22-32s-23e, was completed pumping 400 barrels a day.

In the Playa del Rey area, 12 miles southwest of Los Angeles, Eastern Oil Company's Eastern 1 was swabbed on production November 3. Well is now flowing 250 barrels a day of 28 gravity oil cutting 50 percent water, mud and emulsion. Gas production is 1,000,000 cubic feet. It is expected that this well will require an unusually long time to clean up. Depth is 7563 feet, plugged to 7430 feet, with 4¾-inch liner landed at 7563 feet and cemented through perforations at 7425 feet. The 4¾-inch liner was later perforated above the c.p. point from 7417 feet to 7397 feet. Location is in Section 22-2s-15w, about one mile east of Playa del Rey field, and completion of this well is believed by some to extend the limits of the proven area of the field by that amount. It is known, however, that continuous productive territory does not extend between this well and either the Ocean Front or Del Rey Hills areas of the present field, and it is probable that the oil accumulation at this well is trapped up the dip against a fault. The exact location and characteristics of this fault and the location and extent of the accumulation will be determined only by drilling additional wells.

Drilling to Result

Westport Oil Company's No. 5 at Huntington Beach was completed November 2 pumping 325 barrels a day of 26 gravity oil cutting 4 percent. As soon as sufficient pressure built up the well started flowing, and present production is 400 barrels a day of 26 gravity oil cutting 0.4 percent. Flow is through a 34/64-inch choke, with tubing and casing pressures of 325 pounds and 600 pounds respectively. This is by far the best completion in the old field in many months, and it is expected that a fair sized drilling campaign will result. Depth is 3980 feet, with 8⅝-inch water string cemented at 3790 feet and 235 feet of 6⅝-inch liner, including 190 feet of perforated, landed at 3980 feet. This well is located at the extreme easterly edge of the field and is surrounded by abandoned wells and small producers. A completion for 100 barrels a day would have been outstanding.

CALIFORNIA

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
HUNTINGTON BEACH—		
Westport Oil Co., No. 5	400	3980
MONTEBELLO—		
Universal Cons. Oil Co., Pasadena 2	230	5696
REDONDO—		
Dumas-Lewis Oil Co., No. 2	130	3635
EAST COYOTE—		
Continental Oil Co., Carlton Com. 2	*	2751
LOS ANGELES COUNTY—		
Charter Oak Oil Co., Bright 1	*	1012
SANTA FE SPRINGS—		
Union's Alexander 35	105	4450
KETTLEMAN HILLS—		
Kettleman No. Dom., No. 47-18J	2780	8931
FRUITVALE—		
Western Gulf, Fisher 1	115	3909
H. L. Whiston, Turner 1	1000	3150
KERN FRONT—		
Honolulu Oil Corp., No. 49	225	2888
Italo Pet. Corp., Cauley 34	100	2890
Pan-American Pet. Co., Kern 25	60	2325
MIDWAY-SUNSET—		
Five Point Pet. Corp., Two-1	65	1050
Gibson Oil Co., Francis 2	1200	3076
Merritt Annex Oil Co., Fried 2	620	2883
South Cerritos Oil Co., No. 3	400	1827
MOUNTAIN VIEW—		
Standard, Mabry 2	295	4900
MOUNT POSO—		
J. J. Chevalier, S. P. 2	45	1455
ROUND MOUNTAIN—		
Shell, Olcese One-8	145	2070
ELWOOD—		
Signal O&G Co., Permit 98, No. 8.	300	3853

*Failures; †Junked; ¶Million cu. ft. gas.

WELL PRODUCES
New Michigan field may be developed rapidly

Mount Pleasant, Mich.—McClanahan Oil Company's Seignifous 1, Section 3-20n-4e, Arenac County, filled and started flowing oil by heads on November 8, after casing in the Dundee top and bailing down Traverse water within 300 feet of the bottom.

Corrected measurements placed the Dundee lime top at 2455 feet and bottom of the hole at 2470 feet. From 200 to 300 feet of Traverse water was still believed in the hole on November 10, after an unsuccessful attempt to swab. The well averaged 10 barrels an hour the first three days on production.

Seignifous 1 is located approximately 30 miles southeast of West Branch and on the Ogemaw-Arenac County structure, which has been a subject of desultory exploration for 10 years. West Branch field, with some production in the Traverse but principally in the Dundee lime, was discovered in 1933. It centers, as now developed, at West Branch.

In West Branch field and in previous deep tests in Arenac County, a Dundee section ranging from 150 to 250 feet has been established, with pay from several zones. The West Branch field produces its best pay from 150 to 190 feet in the lime. Here, however, there is little porosity and gas pressure, with virtually all wells treated or shot before making commercial production. Pumps are installed at once, with few exceptions. Wells average about 20 to 35 barrels daily.

In view of a possible thick lime section with additional pays, and with fair assurance that the water table will not be picked up for at least another 100 feet if there is any conformance in the geology of the district, optimism has mounted to a high point for the McClanahan discovery. The lime pay is highly granular and comparatively porous.

While McClanahan Oil Company has about 700 acres checkerboarded in the area, leases are split widely between both independents and major companies.

MUCH DRILLING

Mount Pleasant, Mich.—The current winter period may be the most active in Michigan's history as a result of recent wildcat strikes and extensions. Approximately 100 tests are active at present, with between 15 and 30 new locations made the past three weeks for which drilling permits as yet have not been issued.

MICHIGAN
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
IONIA COUNTY—		
Ed Swearer's Alexander 1, nw ne nw, 8-12n-2w	*·	3450
GRATIOT COUNTY—		
Massigan Gas Corp.'s Shaver 7, c nw sw 4-10n-4w	¶15	990
ISABELLA COUNTY—		
Brehm-Hollman's McBain 1, sw sw se 13-15n-3w	*	3690
MIDLAND COUNTY—		
G. M. Obenauer's Bowland 1, ne sw nw, 19-15n-2w	*	3670
Braden & Saunder's Stapleton 5, ne nw ne 13-14n-2w	500	3555
Pyramid Oil Co.'s Wayne 1, sw sw sw 9-13n-1w	79	3430
H. E. Bell's Raynor 1, se sw sw 8-13n-1w	100	3439
MONTCALM COUNTY—		
Rex Oil Co.'s Detroit Bank 2, c nw ne 6-12n-7w	¶10½	1290
OCEANA COUNTY—		
E. C. Nelson's Williams 1, ne ne ne 8-14n-16w	*	600
OGEMAW COUNTY—		
Newell & Wougher's Bakley 1, nw nw nw 19-22n-2e	30	2690
Hogan, Inc.'s, Oliver 1, nw nw sw 19-22n-2e	35	2788

*Failures; †Junked; ¶Million cu. ft. gas.

EASTERN FIELDS

WEEKLY STAFF REPORT

Completions
OHIO

Company, Well and Location	Init. Prod. Bbls.	Depth
ALLEN COUNTY—		
David Jones, Chas. Cost 1	4	....
ASHLAND COUNTY—		
Ohio F. G. Co., J. M. Derr 1	¶	2855
R. E. Spahr 2	*	2803
George Perko 1	¶	603
J. W. Mutchler 1	¶	2063
Wade Welch 3	¶	2547
Preston Oil Co., J. C. McFadden 1	*	2917
ATHENS COUNTY—		
Grose & Frebault, C. Moore 1	10	....
Carpenter & Glazier, Jane John Smith 14	20	308
Lena L. Bean 15	*	220
John H. Hartley, A. D. Townsend 2	¶	870
Martin & Son, Ella Martin 27	¶	405
COSHOCTON COUNTY—		
Kuntz, Hulse & Co., Mossholder 1	40	....
Preston Oil Co., Van Winkle 1	¶	....
CUYAHOGA COUNTY—		
Ohio F. G. Co., F. W. Muche 1	*	2627
FAIRFIELD COUNTY—		
Wehrle Co., Bowser 1	*	....
GUERNSEY COUNTY—		
C. W. & Maud V. Stevens, George Jewell 2	¶	1322
Mahala & Co., McMahon & Co. 4	*	1092
HANCOCK COUNTY—		
Arlington Gas Co., Ida Sickle 1	¶	1324
HARDIN COUNTY—		
John B. Shelly Hrs., McCambry 1	50	....
LICKING COUNTY—		
E. H. Everett Co., Montgomery 14	85	....
Rutledge & Mossholder, Teagarden 2	6	....
Blue Rock Oil Co., Chas. Badcock 4	31	2958
Rutledge & Mossholder, Wm. Teagarden 3	9	634
LORAIN COUNTY—		
Ohio F. G. Co., A. D. Carpenter 1	¶	2633
Edson & Son, Reuben Chester 2	*	2364
McLEAN COUNTY—		
Cox Heirs, Dan McOueen 1	100	....
Sunflower O&G, Lula Cox 1	45	....
Livermore Oil Co., Davis 1	25	....
J. B. Mayer & Co., C. C. Crowe 10	30	....
Troy Refg. Co., R. R. Rowan 2	100	....
MEDINA COUNTY—		
Ohio F. G. Co., Blanch Zeigler 1	*	2591
MONROE COUNTY—		
F. S. Paulus & Co., F. S. Paulus 1	1	....
MORGAN COUNTY—		
J. H. Bacheler & Co., Ross 1	3	....
C. D. Mosher & Co., Yarnell 5	5	....
W. R. Metcalf, Worthington 2	25	....
Penn Construction, Chas. Wood 1	*	990
MUSKINGUM COUNTY—		
Preston Oil Co., Poorman Co. 1	¶	....
Wittmer O&G, Earl Irwin 5	¶	3840
NOBLE COUNTY—		
Chaseville O&G Co., David W. Corwin 4	¶	1025
Barnesville Dev. Co., James Danford 2	1	1665
PERRY COUNTY—		
Preston Oil Co., B. E. Poorman 1	¶	2960
PUTNAM COUNTY—		
H. Labe, C. K. Rodgers 1	1	1343
STARKE COUNTY—		
East Ohio Gas Co., T. & Sorrick 1	¶	....
T. & Sorrick 2	*	....
SUMMITT COUNTY—		
East Ohio Gas Co., Chas. A. Daily 1	¶	4067
WASHINGTON COUNTY—		
Devitt & Co., Chas. Bertram 16	*	703
G. T. Gale Heirs, G. T. Gale Heirs 4	72	951
J. Collett 1	10	....
G. Collett Heirs 1	5	910
R. G. Riggs, Addie E. Carpenter 1	45	940
Henning Bros., Isiah Hendricks 1	40	840
S. S. Uhl & Co., Valentine 1	15	870
Uhl, McGinnis & Co., Thomas 1	5	950
Harris Drlg. Co., Knowlton 1	5	940
Joe Swingle & Co., Chloe McKee 1	3	1041
F. J. Kerr & Co., F. J. Kerr 1	3	952
McIntyre Bros., J. Greenwood 1	2	427
Edw. Fulmer & Co., Fulmer Fee 2	5	520
WYANDOT COUNTY—		
Upper Sandusky O&G, M. Loverick 4	¶	....
Irene Cupp, S. Weigle 1	¶	1447
Upper Sandusky O&G, N. W. Saltzman 7	60	1332

*Failures; †Junked; ¶Million cu. ft. gas.

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THE OIL WEEKLY REPORT ON IMPORTANT *Wildcat Tests*

CALIFORNIA

FRESNO COUNTY

CANTUA CREEK—Mohawk Pet. Co.'s Langer 1, 30-16-15 dr sandy shale 3761 ft. Western Gulf's S. P. Land Co. 3, 3-17-15, td 8531 ft, plugged bottom, stuck pipe to redr.

KERN COUNTY

LERDO—Arkelo Pet. Co.'s Arkelo 1, 23-28-26, dr shale and sand 5390 ft.

RIO BRAVO — Associated's K. C. L. 1, 30-29-35, dr 7683 ft, tough gray fractured shale.

MOUNT POSO—Calcoast Oil Co.'s No. 1, 36-26-27, dr shale 2220 ft.

JASMINE—Doule Pet. Corp.'s Quinn 1, 15-25-27, td 2956 ft, plug 2882 ft, reperforated liner, oil rose in hole to 2000 ft, bailing.

ARVIN—General Pet. Corp.'s Arvin 1, 26-31-29, dr gray sand eight cuts 7214 ft.

KERN FRONT—Alvah M. Kaimes' Sesnon 1, 17-28-27, dr sandy shale 2875 ft.

MOUNTAIN VIEW—Mohawk Pet. Co.'s Earl Fruit 2, 10-31-29, td 6164 ft, swabbed oil and mud, later flowed 100 bbls, 36 gravity oil, cut 2 percent through casing; Earl Fruit 3, rig. Shell's Greer 1, 15-31-29, td 6171 ft, flowing 4,000,000 ft gas, scum of oil.

GRAPEVINE—99 Oil Co.'s Tejon 1, 5-10-19, sd 50 ft. Ohio Oil Co.'s Title Ins. D-1, 21-11-19, dr gray sand 4771 ft. Reserve Oil & Gas Co.'s Ritchie 33-1, 33-11-19, td 6030 ft, redr at 5220 ft; Tejon 33-2, 33-11-19, td 4505 ft, plug 4490 ft, testing for casing leak.

BUENA VISTA—Ohio Oil Co.'s K. C. L. B-1, 4-32-26, abn 5627 ft.

TEN SECTION—Standard's K. C. 11-1, 19-29-26, dr sandy shale 7390 ft. Superior Oil Co.'s K. C. L. 8, 11-30-26, dr silty shale 6286 ft.

MISCELLANEOUS

ALMEDA COUNTY—Seaboard Oil Corp.'s Johnson 1, 13-3-3, dr shale and sand 5260 ft.

HUMBOLDT COUNTY—Texas Co.'s Eureka 2, 22-3-1, dr sand and shale 5701 ft.

KINGS COUNTY—Associated's Avenal 1, 35-23-17, td 3110 ft, plug 2890 ft, sd. A. S. Clare's Layman 1, 20-20-22, lcn. J. P. Herndall & Associates' Spreckles 1, 16-24-18, td 4201 ft, plug 1600 ft, sd. Milheim Oil Corp.'s Resources 1, 20-22-22, sd 5810 ft.

SAN BENITO COUNTY — Associated's Murphy Ranch 1, 5-12-4, dr hard silty sandy shale 4770 ft.

SOLANO COUNTY—Amerada Pet. Corp.'s Hamilton 1, 26-4-2, td 3960 ft, wocs 13⅜ in. at 614 ft; Hoppe 1, 22-4-2, sd 7029 ft.

TULARE COUNTY—J. W. Alford's Williams 1, 28-16-23, dr sandy shale 585 ft. E. P. Jennings' No. 1, 4-4-23, sd 1830 ft. Trico Oil & Gas Co.'s Calif. Western 1, 2-23-23, sd 1800 ft; Callison 1, 27-21-35, dr sandy shale 3376 ft.

MONTEREY COUNTY—Shell's Branch 2, 34-24-10, dr shale 4210 ft. Texas Co.'s Dunphy 1, 30-19-7, bldg road.

SAN LUIS OBISPO COUNTY—Cholame Syn.'s Jack 2, 10-25-15, td 3648 ft, waiting on casing. Archie Mayes' No. 1 (Oceano), rig. R. W. McBurney's No. 1, 23-32-22, dr hard sandy shale 1555 ft. Union's Porter 1, 22-32-15, dr sand and shale 2517 ft. United Foreign Oil Co.'s Panorama 1, 2-32-21, dr light gray sand 2210 ft.

SANTA BARBARA COUNTY

COAL OIL POINT—Bankline Oil Co.'s No. 2, permit 191, sd 4708 ft.

GATO RIDGE—Barnsdall Oil Co.'s Tognazzini 2, dr 776 ft, set 185⅝ in. at 115 ft.

SUMMERLAND—Julia's Dietzman's Filthian 1, 8-4-25, td 1025 ft, bldg rig over old hole to deepen with cable tools.

TOMPCO—O. C. Field's Santa Rita 1, 11-7-33, sd 2064 ft.

BETTERAVIA—E. H. Moore's Union Sugar A-1, 25-10-35, dr shale streaks sand 7908 ft.

POINT CONCEPTION—101 Oil Co.'s Hollister 1, 35-5-33, rur.

CASMALIA—Todos Santos Oil Co.'s No. 1, 29-9-34, td 2365 ft, replacing equip.

VENTURA COUNTY

VENTURA—Ventura Explor. Co.'s Sexton 1, 30-3-22, td 9525 ft, swabbing water.

SESPE CREEK—Wasibi Oil Co.'s Speik 1, 35-5-19, td 1005 ft, r. to straighten hole.

SOUTHERN CALIFORNIA

NEWHALL—Barnsdall's Rancho S. F. 1, 26-4-17, dr hard shale streaks sand 4758 ft. Holbrook Pet. Co.'s Newhall L&F Co. 1, 28-4-16, td 3394 ft, wocs 10 in. at 2564 ft.

COVINA—Charter Oak Oil Co.'s Bright 1, 7-1-9, abn 1012 ft.

GARDENA—Crude Oil Dr. Co.'s No. 1, 31-3-13, sd 5490 ft. Standard Oil Co.'s Bodger 1, 22-3-14, dr shale streaks sand 5900 ft. Universal Cons. Oil Co.'s Carrell 1, 36-3-14, spud 11/5, dr. West American Oil Co.'s Dominguez Estate's 1, 5-4-13, td 6595 ft, plug 720, redr to slant hole.

TORRANCE—Oliver McDowell's No. 1, 35-3-14, sd 7210 ft.

DAVIDSON CITY—Shell's Flood Control 1, 11-4-13, dr sand and shale 4032 ft.

HAWTHORNE — Signal Finance Corp.'s Woods 1, 10-3-14, td 9326 ft, wocs 6⅝ in. at 7128 ft.

FOX HILLS—Superior Oil Co.'s Inglewood Ext. 1, 25-2-15, dr shale 7963 ft.

PLACENTIA—Calif. Eastern Oil Co.'s Verde 1, 31-3-9, td 4750 ft, redr. at 4610 ft.

EAST RICHFIELD—West Coast Ref. Co.'s Yorba 1, 25-3-9, td 2128 ft, plug 1330 ft, to redr and slant 90 ft north of present hole, cored into fault dips 80 degrees.

SAN BERNARDINO COUNTY—Equitable Pet. Explor. Co.'s No. 1, 11-10-5, dr hard sand 2992 ft. Tehama Pet. Co.'s Kraemer-Backs 2, 33-2-8, dr hard sand 940 ft; Pellissier 1, 4-3-8, dr hard sand 1322 ft.

NEW MEXICO

LEA COUNTY—Argo Royalty Co.'s B. T. Lanehart 1, sw se ne 21-25s-37e, elev 3071 ft, set 7-inch cas 3578 ft, testing. Baldridge et al's Blakey 1, c nw ne 5-20s-38e, elev 3586 ft, sd 2155 ft. Brown & Reynolds' Parcell 1, c nw se 8-21s-38e, elev 3573 ft, fsh 1455 ft. Carlock et al's (was Talbot & Mullineaux) Quincy-Ricker 1, c se se 7-16s-36e, elev 3945 ft, dr 1900 ft. Amon G. Carter et al's E. M. Elliott 1, c nw nw 22-22s-37e, lcn; E. M. Elliott 2, c nw nw 22-22s-37e, dk. C. G. Oil Co.-The Texas Co.'s Ellen Weir 1, c ne ne 14-20s-37e, elev 3564 ft, td 4074 ft, testing and lots water with oil. J. C. Clower et al's W. H. Turner 1, c se se 29-21s-37e, elev 3469 ft, lost tools, sd 3483 ft. Barney Cockburn and Rowan-Nichols Oil Co.'s H. G. Mattern 1, c sw se 7-22s-37e, elev 3426 ft, td 3789 ft, running tubing. Conoco & California Co.'s E. M. Elliott 1-A-15, se se se 15-22s-37e, elev 3354 ft, dr 3575 ft; Ira C. Forney 1-A-5, c sw se 5-23s-36e, elev 3457 ft, rur; Rex Williams 1-A-27, c sw sw 27-23s-35e, elev 3428 ft, rur. Culbertson, Erwin & Stovall's J. R. Stuart-Repollo 2, nw se se 10-25s-37e, elev 3108 ft, dr 3215 ft. Devonian Oil Co.'s A. L. Christmas 1, ne ne se 28-22s-37e, elev 3339 ft, rust. Empire O&R Co.'s Sim Dabbs 1, c nw nw 23-25s-37e, elev 3086 ft, testing 3120 ft; Anna Walden 1, c se nw 21-22s-37e, elev 3352 ft, dr 2900 ft; State 1, c sw sw 5-21s-35e, elev 3652 ft, tested sul w 3852 ft, dry and abd. A. R. Eppenauer et al's F. B. Stuart-Amerada 1, ne nw ne 22-25s-37e, elev 3082 ft, cem sur cas. J. E. Farrell & Co.'s E. W. Walden-Amerada 1-C, c sw sw 15-22s-37e, elev 3385 ft, rust, td 1169 ft; Walden-Amerada 1-A, c sw nw 15-22s-37e, sp and sd. Geo. F. Getty Oil Co.'s D. C. Hardy 1, c se se 20-21s-37e, elev 3494 ft, sd 1356 ft. Harry W. Leonard et al's B. T. Lanehart 3, c ne nw 21-25s-37e, elev 3081 ft, mim. Magnolia Pet. Co.'s E. O. Carson 3, c sw sw 28-21s-37e, elev 3467 ft, rust, td 1337 ft; State 1-G, nw nw ne 24-17s-34e, rur. Maljamar O&G Corp.'s Baish 7, c se nw 21-17s-32e, dr 360 ft. Joe C. Maxwell, R. Crandall and C. H. Osmond's State 1, c sw nw 32-10s-34e, elev 4205 ft, cem 10¾-inch pipe 2165 ft, td 2175 ft, rust. N. G. Penrose and Rowan-Nichols Oil Co.'s Will Cary-Humble 3, c se nw 22-22s-37e, elev 3364 ft, sd 1150 ft. Plains Prod. Co.'s J. A. E. Knight-Humble 2, c nw sw 22-24s-37e, elev 3234 ft, dr 2190 ft; Knight-Humble 3, c se se 21-24s-37e, elev 3218 ft, dr 400 ft; Knight-Humble 4, c sw sw 22-24s-37e, cellar. Repollo Oil Co.'s O. J. Boyd 2, nw nw nw 23-22s-37e, elev 3338 ft, dr 1250 ft; Jamison 1, sw se ne 21-24s-37e, elev 3227 ft, dr 3100 ft; York 1, se se ne 20-21s-37e, elev 3495 ft, dr 1300 ft. Rushwold Oil Co.-Conoco & California Co.'s E. E. Carter 1, c nw ne 30-20s-39e, elev 3559 ft, fsh 508 ft. Samedan Oil Corp.'s S. B. Hughes 1, c ne sw 4-23s-37e, elev 3321 ft, td 3648 ft, shot twice and used acid, pumped 113 bbls oil completed; Hughes 2, c nw se 4-23s-37e, elev 3318 ft, machine. Shell Pet. Corp.'s Black 1, c nw ne 21-24s-37e, elev 3227 ft, dr 2650 ft. Skelly Oil Co.'s G. W. Sims 1, c ne nw 10-23s-37e, elev 3301 ft, td 3607 ft, fsh tools and flowing 7 bbls oil per hr; Hugh C. Sims 1-D, c se nw 3-23s-37e, elev 3300 ft, dr 1200 ft; W. P. Sims 1, c ne ne 10-23s-37e, elev 3298 ft, testing hfo, td 3650 ft; W. P. Sims 1-B, c nw ne 10-23s-37e, elev 3296 ft, dr 725 ft; F. S. Stuart 1-A, near c ne nw 15-25s-37e, elev 3105 ft, cem 7-inch cas 3247 ft; R. R. Sims 1-C, c se sw 3-23s-37e, elev 3297 ft, dr 300 ft; R. R. Sims 2, c ne sw 3-23s-37e, elev 3298 ft, machine. Stnolind O&G Co.'s P. J. Langley 1, c se nw 15-25s-37e, elev 3109 ft, pb fr sul w at 3418 ft to 3413 ft, est 200 bbls oil with water, to pb again. W. H. Street et al's Wood-Humble 1, near c se ne 22-22s-37e, elev 3355 ft, dr by cas 1174 ft. Sun Oil Co.'s I. R. Stuart 2, c sw ne 15-25s-37e, rur. The Texas Co.'s Jas. F. Black 1, c sw ne 21-24s-37e, elev 3225 ft, dr 1050 ft; J. D. Young 1, se se se 5-24s-37e, elev 3277 ft, making gas, dr 3115 ft.

ROOSEVELT COUNTY—Claudell Dev. Co.'s Wilmes 2, c se ne 17-2s-30e, lcn abn. Franklin Oil Corp. et al's Rual Giphant 1, nw nw nw 28-3n-30e, elev 4458 ft, dr lime 2450 ft. Joe C. Maxwell, Inc., R. Crandall and C. H. Osmond's A. B. Williamson 1, c nw nw 7-8s-36e, rur. Clovis Dev. Co.'s S. Smith 1, c se ne 17-2s-30e, dk.

EAST TEXAS

BOWIE COUNTY—Woodley & Bentley's J. D. Lumpkin 1 (245-ac), John McDermott sur, 1¼ mi sw Dalby Springs, elev 290 ft, Annona chalk 1665-2090 ft, sd 3905 ft.

CHEROKEE COUNTY—A. F. Richardson et al's F. P. O'Brien 1 (167-ac), G. S. Clapp sur, 3 mi n by w of Rusk, lcn. General Crude Oil Co.'s Mrs. S. L. Stockton 1 (103-ac), S. Jarboe sur, 3 mi ne Mount Selman, rur. Dr. H. Hancock et al's Mrs. Pryor-Shell 1 (53-ac), J. T. Jones sur, Rusk area, mim.

COLLIN COUNTY — California Consolidated Oil Corp.'s Mrs. W. L. Fagg 1 (38-ac), Jas. Rutherford sur No. 4, elev 626 ft, Georgetown lime 1980-2651 ft, top Paluxy series 2706 ft, td 2771 ft, drl cement plugs to test. Port Bolivar Co.'s O. C. Durning-Clarkston 1-A (140-ac), Wm. Creager sur Pat. 1193, elev 722 ft, dry on dst at 4050-4100 ft, to set pipe and test; A. Shirley 1 (50-ac), Gwynn Morrison sur, 1 mi e Anna, dk.

DELTA COUNTY—W. S. McGee et al's Mrs. P. W. Miller 1 (52-ac), E. Spencer sur, 1 mi sw Cooper, elev 465 ft, top Woodbine Red Beds 2650 ft, top Georgetown lime 3040 ft, sd 4123 ft.

FALLS COUNTY—J. Edward Mills et al's Sam Grucholski 1 (40-ac), Dennis Herold League, 5 mi sw Kosse, elev 521 ft, Austin chalk 2765-2946 ft, Georgetown lime 3544-3825 ft, top Edwards lime 3867 ft, top upper Glen Rose 4074 ft, sd 4114 ft, may dd to basal Trinity.

FREESTONE COUNTY—Fred R. Lovering et al's E. Bonner-Scott 1 (23-ac), H. Awalt sur, 7 mi n Fairfield, Pecan chalk 2175-2286 ft, top Austin chalk 3117 ft, dr 3410 ft. J. R. Meeker et al's Mrs. D. Wheeler 1 (10-ac), J. Y. Aguilera sur, Red Lake area, lcn. Red Lake Oil Corp.'s M. Wheeler 1 (160-ac), J. Y. Aguilera sur, 3 mi se Turlington, elev 429 ft, Pecan chalk 3088-3212 ft, Austin chalk 4120-4560 ft, top Woodbine series 4885 ft, td 4954 ft, pref cas 4882-4899, est 3,000,000 ft gas, tubing press 1800 lbs and cas press 1700 lbs. Roger Steward and Velvet Oil Co.'s E. H. Beauchamp 1 (100-ac), E. Greene sur, 4 mi nw Fairfield, sp and sd.

GRAYSON COUNTY—Olson Drl. Co.-Jas. H. Gardner and Broswood Oil Co.'s D. R. Utiger 1 (160-ac), P. P. Cady sur, 5 mi nw Denison, elev 722 ft, show o&g in Trinity 860-890 ft, base Trinity series 930 ft, top chert 950 ft, dr 1410 ft.

HENDERSON COUNTY — Cosden Oil

Corp.'s Mrs. Zenia Miller 1 (1251-ac), Thomas Chaffin sur, elev 451½ ft, dr Pecan chalk 3330 ft. Wm. McDougal, Tr., et al's Elvira Price 1 (216-ac), M. Matthews sur, 3½ mi s Trinidad, elev 294 ft, Pecan chalk 2100-2390 ft, Austin chalk 3050-3484 ft, sd 3831 ft. S. Sparks, Keeley et al's Theo. H. Berry 1, Asron York sur No. 847, 5 mi s Brownsboro, sp and sd.

HOPKINS COUNTY—Empire O&R Co.'s J. E. Worsham 1 (149.36-ac), Alex O. Wetmore sur, lcn. Walter L. Goldston et al's H. J. Smith 2 (250-ac), Jas. A. Craft sur, elev 435 ft, Pecan chalk 1500-1610 ft, Austin chalk 2520-2585 ft, top Woodbine 3390 ft, top Georgetown lime 3630 ft, top Paluxy series 4420 ft, pay zone 4458-4519 ft, flowed rate 37 bbls oil per hr on ½-inch choke; Smith 3, mim. D. S. Hager and W. P. Luse's J. G. Reynolds 1 (200-ac), A. O. Wetmore sur, lcn. Hager-Luse & Russ Pet. Co.'s J. E. Worsham 3 (149.36-ac), A. O. Wetmore sur, elev 433 ft, Pecan chalk 1520 ft, top Woodbine 3132 ft, top Georgetown 3680 ft, Paluxy pay 4476-4524 ft, cem 7-inch cas 4476 ft, testing; J. E. Worsham 4, elev 443 ft, Pecan chalk 1558-1638 ft, Paluxy pay 4471-4537 ft, cem 7-inch cas 4500 ft, testing; Worsham 5 and 7, rigs.

LAMAR COUNTY—J. A. Forester et al's J. S. Woodward 1 (18¾-ac), J. W. Woodward sur, 1½ mi e by s of Minster, elev 402 ft, top Georgetown 2256 ft, Paluxy sand 3060-3144 ft, top anhydrite 3735 ft, base hard anhydrite 4075 ft, broken to 4105 ft, td 5129 ft, fsh cas. H. Salmon, Lowery & Cutler's E. C. Porter 1 (30-ac), Thos. King sur, 3 mi ne Chicota, dk.

NAVARRO COUNTY—Calto Oil Co.'s Etta Black 1 (160-ac), B. G. Balthrope sur, 1 mi sw Bazette, mim and sd. Philip S. Groginski et al's S. P. Love 1 (128-ac), Richard Goad sur A-33, 3½ mi sw Corsicana, elev 422 ft, Austin chalk 1153-1525 ft, top Woodbine 1918 ft, Georgetown lime series 2270-2463 ft, top upper Glen Rose 3160 ft, stringer anhydrite 3875-3937 ft, sd in lower Glen Rose 4223 ft.

RAINS COUNTY—Humble O&R Co.'s O. L. J. Easter 1 (39¾-ac), R. Hotchkiss sur, 4¼ mi e Emory, 7600 ft Trinity test, dr 2500 ft.

RED RIVER COUNTY—J. S. Abercrombie Co.-Harrison Oil Co.'s Southern Pine Lumber Co. 3 (392.37-ac), D. D. Burton sur, 10 mi ne Clarksville, dr 1275 ft. Roy I. Carter Drl. Co. et al's J. A Tutt 1 (40-ac), Dennis Harty sur, lcn. Carpenter Oil Corp.'s R. E. Anderson 1 (100-ac), S. W. Sims sur, 3 mi n Clarksville, dr 750 ft. T. J. Farrington et al's W. T. Morris 1 (351-ac), Joseph Guest sur, 1 mi s Detroit, elev 478 ft, sd 1200 ft. M. Petroff et al's R. C. Morris 1 (176-ac), Joseph Guest sur, 2 mi w Detroit, sp and sd. Dale Sneed, R. H. Manning and Texfornia Co.'s Hooker-Hughes 1 (80-ac), MEP&P Ry sur No. 642, 6 mi sw Lydia, elev 307 ft. Pecan chalk 995-1302 ft, top Austin chalk 2018 ft, sd 2720 ft.

ROBERTSON COUNTY—J. Edward Mills et al's Tony Congelosi 1 (75-ac). Geo. A. Nixon sur, 3½ mi sw Hearne, sd 2250 ft.

RUSK COUNTY—John W. Merritt et al's J. A. Stallings 1 (47-ac), Thos. Uzzell sur, 2½ mi s Eastex field, ¼ mi sw Pleasant Grove, elev 360 ft, Pecan chalk 2680-3015 ft, top Austin chalk 3639 ft, sd 3863 ft.

SMITH COUNTY—W. L. Cloud et al's Dora Kendall 1-A. John Williams sur, 1¼ mi se Jamestown, sd 2532 ft.

WOOD COUNTY—G. W. Nix et al's Mrs. E. A. Russell 1, John Delap sur, 4 mi w Golden, sd 600 ft.

SOUTH LOUISIANA

ACADIA PARISH—H. E. Dalton's Setting 1, Trilby prospect, 17-9s-1w, sd 5047 ft. Humble's Nordyke 1, Ebenezer prospect, 23-10s-1e, mim.

ALLEN PARISH—Humble's Bel 3, Bel prospect, 28-6s-7w, dr shale 2934 ft.

CAMERON PARISH — Magnolia's School Land 1, Johnson Bayou prospect, 16-15s-14w, dr shale and lime 8402 ft; same operator's R. Le Bleau 1, Big Lake area, 13-12s-8w, dr shale 7292 ft. Pure's State Mallard Bay 1, Mallard Bay prospect, 22-13s-3w, dr shale 6004 ft.

EAST BATON ROUGE PARISH—Cavalier Oil Co.'s Vignes 1, ne of Hope Villa, 40-8s-2e, dr shale 6425 ft.

IBERIA PARISH—Texas Co.'s State Fausse Point 1, Fausse Point prospect, 35-11s-8e, dr shale 6329 ft; same operator's State Vermilion Bay B-1, in Vermilion Bay, 20-15s-6e, dr shale 9122 ft.

IBERVILLE PARISH—Humble's Wilbert 1, Bayou Blue, 67-9s-11e, dr shale 3108 ft.

JEFFERSON DAVIS PARISH — Shell's Sturdevant 1, South Roanoke prospect, 25-10s-4w, fsh 9749 ft. Stanolind's Calcasieu National Bank 1, South Jennings prospect, 15-10s-3w, preparing for a production test at 8648 ft.

LA FOURCHE PARISH—Wm. Helis' City of New Orleans 1, Marchland prospect, 19-23s-23e, dr water sand 3780 ft. Pan American Production Co.'s Harange 1, Valentine prospect, 7-17s-20e, ru.

PLAQUEMINES PARISH—Gulf's State Bay Adams 1, in Bay Adams, 32-19s-28e, dr shale 1803 ft. Tide Water's Manhatten Fruit 2, Venice dome, 26-21s-30e, dr shale 2615 ft.

ST. BERNARD PARISH—John Cartwright's Nunez 1, e of New Orleans, 10-13s-12e, abd 6621 ft. Gulf's Lake Lery 1, Lake Lery prospect, 28-14s-14e, dr shale 1808 ft. Southern Sulphur Co.'s State 2, Lake Borgne area, 38-14s-15e, sd 752 ft.

ST. JAMES PARISH—Shell's Colonial Sugar 2, Hester prospect, 5-12s-5e, dr shale 6732 ft.

ST. LANDRY PARISH—Stanley Thompson's Lewis 1, ne of Port Barre, 25-9s-6e, dr shale 1946 ft. Superior Oil Producing Co.'s A. Savoie 1, ne of Bosco, 26-8s-3e, dr shale 1180 ft.

ST. MARTIN PARISH—Shell's Hefea Land Co. 1, Gecho-Arnaudville area, 38-8s-5e, dr shale 1509 ft.

ST. MARY PARISH—Mike Hogg's Bayou Teche 1, w of Charenton, 5-13s-9e, running an electrical logging device 8008 ft. Texas Co.'s State Bayou Sale 1, Wax Lake prospect, 40-7s-9e, dr shale 8087 ft.

TERREBONNE PARISH—Humble's Elender 1, Houma gas field, 23-19s-19e, fsh 7001 ft. Shell's Realty Operators 1-B, 11 mi w of Houma, 18-17s-15e, driving piling.

VERMILION PARISH — Continental's Hebert 1, Abbeville prospect, 20-12s-3e, dr in sdtr hole 10,990 ft. Stanolind's Fred Stovall 1, South Abbeville prospect, 89-14s-3e, dr shale 5015 ft.

EAST TEXAS BORDER COUNTIES

HARRISON COUNTY—Hanover, Begendoll et al's Buchanan 1, Wm. McIlvain sur, sd 4222 ft. H. H. Roberts et al's Zion Douglas 1, L. S. Field sur, dk and mir. Weiss et al's W. L. Rudd 1, Wm. Steele sur, lcn.

PANOLA COUNTY—A. C. Glassell's Frost Lbr. Co. 1, Mary S. Potts sur, elev 216 ft, wo gauge, using gas to dr nearby wells, td 6002 ft. Williamson 1, H. Coleman sur, woc 887 ft. Danciger O. & R. Corp.'s J. W. Tatum 1, Alfred Bissell sur, sd 21 ft. Lawler Pet. Co.'s C. T. Becknall 1, Bailey Anderson sur, dr 2162 ft, chalk. White Goodwin Synd.'s Hill 1, Winny Mann sur, rur. Logansport P. L. Co.'s Rushing 1, Mannan Smith sur, 7-inch csg, 2477 ft, acidizing, td 2734 ft. Magnolia Pet. Co.'s E. A. Hull 1, Thos. Applewhite sur, elev 232 ft, top Georgetown 2395 ft, dr 4825 ft. Motex Oil Co.'s J. M. Furrh 1, Thos. M. Alstone sur, spd top chalk 1575 ft, dr 1600 ft, chalk. Yandell Rogers' Cameron Lbr. Co. 1, Wm. A. Lagrone sur, lcn.

SHELBY COUNTY—Rubeling & Potter's O. H. Polley 1, Wm. Whisner sur, arr deepen td 4200 ft. Archie Carpenter's Green 1, J. English sur, dr abn, td 3387 ft. Red Wing Oil Co.'s C. H. Herton 1, J. Dowling sur, fsg 1888 ft. H. A. Stebbinger's Pickering Lbr. Co. 1, C. E. Henry sur, si, td 5029 ft. Pure Oil Co.'s J. L. Smitherman 1, S. O. Pennington sur, mim.

NORTH LOUISIANA

BIENVILLE PARISH—Lide Greer et al's J. D. Smalley 1, se sw ne 13-16n-5w, rur (9000 ft test). DeSoto O&G Co.'s Dunn & Olsen 1, n½ nw 15-16n-10w, so in lime 3436 ft, sr 4035 ft. McDowell et al's Locke 1, ne nw ne 9-15n-9w, arr set csg 744 ft. Texas Oil Corp.'s McGee 1, 3-16n-6w, owdd, td 5905 ft.

BOSSIER PARISH—United Gas Public Service Co.'s Skannal F-1, 26-17n-12w, flowing 96 bbls oil daily through ¼-inch choke, td 5201 ft, Pettit sand; Skannal G-1, se ne 22-17n-12w, woc 3255 ft; Roos 1, 23-17n12w, tested 12 mi ft gas, si for gauge, td 5209 ft. Ark.-La. Gas Co.'s McDade 1, 817n-11w, 9-inch csg, 7-inch csg 4216 ft, wo, td 4294 ft.

CADDO PARISH—Prairie River Oil Synd.'s Hutchinson 1, sw sw 15-15n-12w, elev 152 ft, top Travis Peak 5845 ft, sd 7396 ft. Ferguson & Co.'s Huckabay 1, 22-22n-16w, dk. Gulf's E. P. Hatcher 1, 11-17n-15w, elev 269 ft, top Travis Peak 5998 ft, fsg 6896 ft. Producers O. & G. Co.'s Currie et al 2, ne se 32-19n-16w, swabbing 954 ft.

CLAIBORNE PARISH—E. T. Oakes' Patton Est. 2, ne ne 1-20n-5w, elev 357 ft, so in lime 7-inch csg 5007 ft, tested 180 ft oil and mud 5099-5115 ft, dr 5130 ft. Sugar Creek Synd.'s Darrett 2, se sw 31-20n-5w, fsg, td 8016 ft. United's Taylor 1, 1-19n-5w, dr 5763 ft. Max Hirsch et al's C. O. Ferguson 1, nw sw 29-22n-6w, mim.

DE SOTO PARISH—Sundby et al's Garland 1, se nw 7-14n-14w, coring 2655 ft, (corrected depth). Kamon et al's Roscoe 1, se nw 14-13n-13w, 7-inch csg, 1092 ft, topped chalk 1625 ft, claim so and sg arr acidize, td 1810 ft, shale. Julian-Igoe Synd.'s Hallie Smith 1, se se 31-14n-15w, lcn. Pearl Oil Corp.'s Joyner 1, se nw sw 28-11n-12w, spd. Grogan et al's (formerly L. S. Fites) Ramsey 1, 36-11n-11w, dr 1680 ft, chalk. Sanders et al's L. N. Allison 1, nec 17-14n-13w, mir. R. C. Payne's Harris 1, 11-13-14, arr core 2832 ft.

MOREHOUSE PARISH — Henry E. Rondeau et al's E. M. Clarke 1, ne se 10-22n-7e, elev 180 ft, top red beds 2874 ft, sd 3871 ft.

NATCHITOCHES PARISH — Natchitoches Oil Co.'s J. S. Simpson 1, 12-17n-7w, dr 1350 ft, shale. Lent et al's Locke 1, se sw 26-9n-9w, spd, sd 30 ft. C. D. Morrison's Moffit 1, se se 19-10n-10w, sd 220 ft. Union Pet. Co.'s DeBlieux 2, 83-10n-7w, sd 3951 ft, chalk. A. J. William's Coats 1, 31-10n-10w, rog.

RED RIVER PARISH—Hunter et al's Long-Bell Lbr 1, ne ne 1913n-9w, 7-inch csg 3696 ft, bailed sw, pb to 3696 ft, retesting with gas, td 3734 ft.

RICHLAND PARISH—Gulf's R. R. Rhymes 15, nw se ne 32-17n-6e, elev 77 ft, top anhydrite 2936 ft, base red beds 6380 ft, dr 8060 ft.

SABINE PARISH—Whitehurst et al's Whitney Corp. 1, c nw ne 8-9n-13w, co preparatory to running 5¾-inch csg, td 5503 ft. A. H.

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Tarver's Baker 3, ne nw 36-8n-12w, showed sw, sd 6178 ft.

WEBSTER PARISH—Ohio Oil Co.'s Bodcaw Lbr. Co. 1, c ne se 28-21n-10w, dr 6738 ft. R. M. Coyle 1, c ne se 22-21n-10w, dr 6652 ft. United's Nixon 1, 22-21n-10w, dr 6620 ft. C. V. Davis 2, c nw nw 23-21n-10w, dr 6481 ft. Magnolia's Cox 1, 23-21n-10w, dr 6396 ft. R. W. Norton's Fee 1, 27-21n-10w, mim. Woodley Pet. Co.'s R. R. Cox, sw sw 23-21n-10w, dr 5625 ft; L. C. Cox 1, 28-21n-10w, dr 3325 ft. Skidmore's Barnett 1, 29-17n-9w, arr deepen 1650 ft. Seaboard Oil Corp.'s Cotton Valley L. & T. Co. 1, nw sw 35-22n-10w, 20-inch csg 262 ft, 15-inch csg 1237 ft, dr 2976 ft.

KANSAS

BARTON COUNTY — Brouk et al's Keil 1, se se ne 11-16s-15w, testing. C. L. Price's Deutsch 1, nw nw ne 16-16s-13w, set 6-inch csg 3153 ft, sd. F. E. Bailey et al's Hammeke 1, nw ne sw 12-18s-12w, sd 315 ft. Missouri Valley O & G Co.'s Peach 1, se se se 24-16s-14w, rust. Freehorn et al's Sooy 1, nw nw ne 27-18s-12w, cel. Minnehoma O&G Co.'s Smith 1, nw nw ne 20-18s-13w, rr.

BUTLER COUNTY—Simpson Oil Co.'s Deblem 1, sw sw sw 11-26s-6e, hfw 3010 ft. Hutchinson O&G Co.'s Westfall 1-A, se sw se 13-27s-3w, dr 2525 ft. Ed Solomon's Church 1, sw ne se 8-25s-5e, sd 200 ft.

CHASE COUNTY—Hanna et al's Brothers 1, se se nw 25-20s-8w, loc. Propp et al's Fromm 1, se se se 29-18s-9e, sd 2150 ft.

CLARK COUNTY — Olson & Watchorn's Morrison 1, cse sw 17-32s-21w, testing.

COWLEY COUNTY — Home Natural and McNish's Werner 2, se se sw 31-32s-6e, to dd. Croft et al's Whitson 1, ne ne ne 20-33s-4e, ru. Wakefield et al's Tinker 1, nw nw se 26-32s-3e, dr 1320 ft. C. H. Cross' Cook 1, sw sw sw 6-32s-6e, ru mach.

EDWARDS COUNTY—Stanolind & Elwell's Donovan 1, c se se 14-25s-18w, dr by. Royal Pet. Corp.'s Krupp 1, nw nw se 18-24s-19w, rig.

ELLIS COUNTY—Empire's Samuelson 1, ne ne sw 31-11s-16w, ur 5-inch csg. Bridgeport Mach's Ubert 1, ne ne nw 12-13s-18w, dr cement. Trigg et al's Armbrister 1, se se sw 6-11s-19w, dr 2975 ft. Lario's Marshall 1, nw se ne 36-11s-18w, td 3646 ft, 2900 ft oih. Champlin et al's Hadley 1, se sw ne 30-11s-17w, td 3794 ft, sdo. Ted Kerr et al's Koblitz 1, se sw nw 23-12s-18w, co 2985 ft. Glick & McMorrow's Staab 1, sw sw se 6-13s-17w, dr 3520 ft. Taylor et al's Emery 1, ne ne ne 23-14s-18w, dr 2060 ft. Winkler & Koch's Jensen 1, sw sw ne 3-13s-18w, rig. Brouk et al's Jacobs 1, nw nw se 31-15s-16w, dr 2915 ft. Bridgeport Mach's Madden Est. 1, ne nw nw 26-15s-18w, td 3595 ft, p 619 bbls oil, comp. Murphy Oil Co.'s Wisner 1, se se sw 12-14s-19w, set 15-inch csg 600 ft. Jones Bros. et al's Phillips 1, se se nw 9-15s-17w, dr 355 ft. Lario O&G Co.'s Cress 1, ne ne ne 13-11s-17w, fsg 683 ft.

GRAHAM COUNTY—Nook & Young's Hills 1, nw se se 19-10s-21w, dr 3654 ft. Sam Murphy & Alcorn Wamoff 1, c nw nw 27-10s-22w, td 4123 ft, d and abnd.

GREENWOOD COUNTY—Hale & Reese's Needles 1, ne sw nw 12-25s-10e, set 6-inch csg 1750 ft, sd. Estes et al's Edgar 1, nw nw se 1-28s-8e, dr 840 ft.

HARVEY COUNTY—Harburney Oil Co.'s Schragg 1, nw nw se 24-22s-3w, sd 3265 ft. Saco et al's Guthrie 1, ne ne nw 8-22s-2e, spd.

HASKELL COUNTY—Helmerich & Payne's Meredith 1, c sw 10-30s-33w, rur.

KEARNEY COUNTY—J. L. Murphy et al's Campbell 1, nw nw sw 32-25s-35w, dr 2020 ft.

LOGAN COUNTY—Rosespring Drlg. Co.'s Wright 1, c se se 12-15s-35w, rur.

MARION COUNTY—Western Kansas O&R Co.'s Hauser 1, sw sw sw 19-19s-4e, ru. Harwood Oil et al's Mott 1, ne ne ne 2-17s-4e, sd 1775 ft.

MEADE COUNTY—Pacific Midwest Co.'s Rexford 1, ne se sw 8-30s-29w, ru.

NESS COUNTY—Newton Dev. Co.'s Tenny 1, nw nw se 19-18s-25w, sd 2450 ft. Sayre Oil Co.'s Ryersee 1, c ne se 34-18s-21w, sd 4270 ft.

PRATT COUNTY—H. V. Elwell et al's Fay 1, nw nw se 15-27s-14w, fsg 4355 ft. I. T. I. O. & Olson's Bolt 1, c nw ne 5-29s-11w, co 4568 ft.

RENO COUNTY—Miller et al's Detter 1, ne se nw 28-22s-7w, sd 3205 ft. Pryor & Lockhart's Kerr 1, c nw 22-23s-8w, ur 5-inch csg. Foraker et al's Hiett 1, se sw ne 34-24s-4w, ur 6-inch csg 3520 ft. Clyde Pulse et al's Payne 1, sw nw ne 4-22s-7w, dr 1800 ft. Carlock et al's Brown Royalty Co. 1, nw nw ne 32-22s-10w, rr. Torry & Feaster's Schroeder 1, se se se 1-23s-7w, bldg rig. Inca Prod. Co.'s Moore 1, c ne ne 26-24s-3w, dr 1130 ft.

RICE COUNTY — Allison & Fitzwilliam's Foby 1, nw sw nw 17-19s-7w, td 3610 ft, d and abnd. Buckley's Bailey 1, sw sw nw 19-20s-6w, rig. Charles Pet. Corp.'s Speck 1, nw nw se 29-20s-8w, fsg 2795 ft. Carlock et al's Deweese 1, sw nw nw 32-20s-7w, rust. Shell Pet. Corp's Soenken 1-A, c nw 10-19s-9w, dr 1590 ft. Aylward et al's Johnson 1, nw nw ne 17-21s-7w, rig.

ROOKS COUNTY—Lester & Dean's Burtt 1, se se ne 29-10s-2w, sd 3422 ft. L.C.D. Drlg. Co.'s Westhusin 1, c ne se 11-19s-17w, 150 ft oih, 8 hrs, to dd. J. A. Shoemake's Stebbins 1, ne ne sw 26-7s-17w, pb 2806 ft, p water. Buckner & Schaff's McConnell 1, ne ne ne 34-6s-18w, ur 12-inch csg 761 ft. Empire's Ham 1 sw nw nw 24-8s-19w, dr 1990 ft. Jarvis & Strickland's Hamel 1, se se sw 7-8s-20w, rur. Graham et al's Fike 1, sw sw sw 9-9s-17w, rr. Westgate-Greenland Oil Co.'s Fossey 1, sw sw se 12-22s-8w, set 12-inch csg 205 ft, woc.

RUSH COUNTY—Skeeles et al's Grumbein 1, sw sw ne 7-16s-20w, cel. Ralph Wixton et al's Gorham Est. 1, nw nw sw 35-15s-16w, co 3300 ft, cl. Sheedy et al's Bison 1, sw sw sw 35-16s-17w, sd 3370 ft. Schoenfeld & Kitch's Winget 1, se se se 15-16s-16w, spd.

RUSSELL COUNTY — Hartman & Blair's Johnson 1, nw nw nw 11-13s-15w, woc. Equity Gas Co.'s Harbauk 1, nw ne se 19-13s-12w, ru mach. Eldorado Ref. Co.'s Scott 1, nw nw ne 17-13s-13w, sd 835 ft. Joe Aylward et al's McAllister 1, ne ne se 9-12s-13w, td 3568 ft, sdo.

SALINE COUNTY—James Brouk et al's Othelander 1, ne nw se 10-16s-13w, ur 8-inch csg 2455 ft.

SEDGWICK COUNTY—Lauck's McLean 1, c sw se 1-27s-1w, sd 4123 ft. R. J. Wallace et al's Sheer 1, sw sw sw 22-27s-3w, fsg 3936 ft. Cameron et al's Smith 1, sw se se 13-27s-2e, mim.

SMITH COUNTY—Helmerich & Payne et al's Meyer 1, ne ne sw 10-5s-11w, dr 2155 ft.

STAFFORD COUNTY—Skelly's Kipp 1, se se ne 27-25s-14w, dr 3996 ft. C. E. Skiles et al's Leidigh 1, nw nw sw 21-22s-11w, dr 2815 ft. Empire et al's Jordan 1, sw sw nw 15-25s-14w, dr 2392 ft.

SUMNER COUNTY—The Texas Co.'s Reed 1, ne se se 11-31s-1w, dr 4027 ft. Rosespring's Rutter 1-A, c nw nw 21-33s-2e, dr 338 ft. C. L. Husted et al's Evers 1, ne se se 11-31s-1w, sd 519 ft. W. C. McBride & Olson's Kinlund 1, ne nw ne 24-34s-1e, dr 3636 ft.

TREGO COUNTY—G. M. Pigott et al's Burkett 1, c sw 15-11s-22w, td 3889 ft, d and abnd. McNeely et al's John Lemke 1, nw nw sw 7-11s-22w, td 4040 ft, d and abnd. York State Oil Corp.'s Gugler 1, sw sw sw 36-12s-21w, sd 3779 ft. Hall et al's Deines 1, se se se 12-13s-24w, td 4857 ft, d and abnd.

WOODSON COUNTY—Dunn & Lewis' Dawson 2, c ne ne 27-26s-13e, dr 925 ft. Sheedy et al's Eagen 1, ne ne se 11-26s-14w, td 1630 ft, d and abnd.

OKLAHOMA

BECKHAM COUNTY — Mid-American Oil Co.'s Biscoe 1, sw se ne 28-8n-22w, mi spd mach.

CARTER COUNTY — The Texas Co.'s Cathey 1, se ne ne 6-5s-1e, woc. Head & Straus' Simpson-Fell 1, nw nw se 8-5s-1e, dr 91 ft.

CLEVELAND COUNTY—H. R. Hollenback et al's Stinson 1, nw nw ne 17-9n-2w, rig. Helmerich & Payne's Glenn 1, c nw ne 6-8n-1w, rur.

COAL COUNTY—Sinclair Prairie Oil Co.'s Culver 1, ne ne sw 16-1n-8e, pb 5318 ft. Continental's Kirby 1, sw se sw 23-1n-8e, td 1990 ft, sd. Continental's Breedlove 1, nw sw sw 24-1n-8e, td 3705 ft; King 1, ne sw ne 26-1n-8e, bailing; Daniels 1, sw ne sw 27-1n-9e, dr 3240 ft. Carter's Warne 1, ne ne nw 31-3n-9e, cor 3868 ft. Shell Pet. Corp.'s Hill 4-A, c nw 30-3n-10e, cor 4159 ft.

COMANCHE COUNTY—L. D. Wise et al's Cones 1, se se sw 11-1n-10w, dr 2090 ft. Frank Scott's Kuntz 1-A, c se ne se 21-4n-11w, sd. Wm. Davis' Aetna Life Ins. Co. 1, se ne ne 22-2n-15w, td 163 ft, d and abnd.

COTTON COUNTY — Phillips Pet. Co.'s Warren 1, ne ne se 1-5s-13w, dr 2463 ft.

GARFIELD COUNTY—Ohio's McFarland 1, se se se 25-24n-3w, td 240 ft, woc.

GARVIN COUNTY—Ellison & Hammond's Selby 1, c nw nw 24-2n-3w, dr 2020 ft. Pure Oil Co.'s Baker 1, se se ne 7-2n-1e, reaming.

HARMON COUNTY—Lioalko Trust, Ltd.'s, Crasnoe 1, se se sw 14-3n-25w, td 2980 ft, sd.

HUGHES COUNTY — T. P. McAdams & Barnes' Koch 1, sw ne ne 1-9n-10e, dr 3214 ft. R. K. Ellison's Peters 1, se nw se 8-6n-10e, dr 1140 ft. Mid-West Oil Co.'s Turner-Lucas 1, c se nw 13-9n-9e, fsg 850 ft.

JEFFERSON COUNTY — Red River Oil Co.'s Trout 1, se ne ne 6-8s-7w, td 2212 ft, sd. Pearson's Douthitt 1, ne ne ne 24-6s-9w, dr 4338 ft. Mid-Continent Pet. Corp.'s Reid 1, c sw nw 32-6s-4w, dr 413 ft. Massad & Swansberger's Barrett 1, ne se se 14-6s-6w, td 12 ft, sd.

JOHNSTON COUNTY—Patten et al's McCrummens 1, sw sw ne 16-1s-6e, dr 325 ft.

KAY COUNTY—Max Kelly's Johns 1, nw nw nw 35-27n-4e, dr 2070 ft.

KIOWA COUNTY—Travis & Scott's Doyle 1, ne se sw 21-5n-17w, td 937 ft, mmo Argus Pet. Co.'s Osbourne 1, nw nw ne 9-7n-16w, fsg 1225 ft. Lykins et al's Aetna Life 1-A, se se se 8-5n-16w, td 750 ft, sd. J. M. Young et al's Cooke 1, ne ne nw 33-2n-16w, fsg 677 ft.

LeFLORE COUNTY—McGraw et al's Tidwell 1, c nw se 17-3n-22e, woc.

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LINCOLN COUNTY—Kemp & Continental's Lobaus 1, nw sw nw 21-17n-5e, rig. Skelly's Sporn, nw ne sw 21-17n-3e, rur.

LOGAN COUNTY—Anthony & Marshall's Fruin-Eckman 1, se se sw 4-16n-1e, co 4958 ft. Helmerich & Payne's Hassler 1, nw nw se 14-16n-4w, dr 4610 ft.

LOVE COUNTY—Sinclair Prairie's Stockton 1, se se sw 26-6s-2w, td 6927 ft, dead.

McINTOSH COUNTY—Stanolind & Ramsey's Tiger 1, nw nw sw 13-9n-15e, dr 4071 ft.

MURRAY COUNTY — Hernsby & Jones' Sadler 1, ne ne nw 20-1n-2e, td 2674 ft. Power Oil Co.'s Lancaster Trust Co. 1, c sw ne 10-1s-2e, td 3002 ft, woc.

NOBLE COUNTY—Shell et al's Moelling 1, c sw nw 31-21n-2w, dr 3145 ft.

OSAGE COUNTY—Chavalier & Simon's No. 1, se se se 24-23n-9e, reaming 8-inch 1533 ft

PITTSBURG COUNTY — Oklahoma Dist. Co.'s Beeler 1, ne ne sw 7-7n-14w, dr 3577 ft.

SEMINOLE COUNTY—Rudco O&G Co.'s Butner 1-A, ne ne sw 15-9n-8e, sd 1950 ft. Amerada et al's Yahola 1, ne nw nw 36-10n-7e, woc. A. I. Spears' Keaton 1, nw nw nw 6-5n-8e, rig.

STEPHENS COUNTY—Ed Parson's Olson 1, c sw sw 21-2n-8w, td 5214 ft, sd. The Texas Co.'s Bohanan 1, ne nw nw 15-3s-15w, mach. T. M. McCasland's Hildebrand 1, sw sw ne 1-3s-1w, sd 4601 ft; Hildebrand 2, c nw ne 1-3s-7w, td 2401 ft, d and abnd. Coline Oil Co.'s Johnson 1, c sw se nw 1-2n-8w, dr 3320 ft. Edwards' Frederick 1, ne se nw 31-2n-8w, dr 300 ft. Jack Cohen's Pierce 1, c ne nw 24-2s-6w, der.

TEXAS COUNTY — Allison & Barnhill's Bingley 1, sw sw ne 30-2n-18e cm, dr 1505 ft.

TILLMAN COUNTY—Beal & Toler's Magell 1, se se se 18-1n-16w, td 595 ft, mom. Eugene Skinner's Oliver 1, se se nw 22-1s-15w, dr 1253 ft. I. T. I. O. Co.'s Drumm 1, c sw nw 32-2s-17w, dr 870 ft.

WASHITA COUNTY — McWhirter et al's Fee 1, sw sw sw 34-8n-19w, dr 1562 ft.

TEXAS GULF COAST

AUSTIN COUNTY—W. H. Mitchell's Fenner 1, J. Fitzgibbon's sur, sd 3417 ft.

BRAZORIA COUNTY — Beaty, Bowles & Borsodie's Truska 1, Algoa prospect, H&TB sur No. 6, dr shale and lime 5989 ft. Gulf's Wilkes & Smith 2, Lochridge prospect, J. W. Hall sur, comp 6366 ft, 465 bbls daily.

BURLESON COUNTY—Red Bank Oil Co.'s Grann 1, Chriesman area, E. Sante sur, setting casing at 5930 ft

CHAMBERS COUNTY—Glenn H. McCarthy's Kirby Pet. Co. 1, n of Cotton Lake, Chambers County School Land sur, dr shale at 5798 ft. Sun's Acom 1, Seabreeze prospect, T&NO sur, sec 128, woc 8200 ft; same operator's White Estate 2, Seabreeze prospect, T&NO sur, sec 128, sd 8869 ft.

COLORADO COUNTY—Sterling's South 1, Garwood prospect, I&GN sur No. 41, to perforate 6072 ft.

FT. BEND COUNTY — Sloan & Zook's Brown 1, Pilant Lake prospect, Barrett & Harris sur, dr shale 3828 ft.

HARDIN COUNTY—Republic-Houston Oil Co.'s Brooks Fee 2, relief well, J. W. Brooks sur, cutting and pulling 7071 ft; same operator's Brooks 3, Silsbee area, J. W. Brooks sur, ru.

HARRIS COUNTY—D. B. Cherry et al's Dodger 1, Epsom Downs area, J. T. Harrell sur, sd 1646 ft. Geo. Lawrence et al's Zapp 1, Bammel area, J. Farwell sur, dr shale 1793 ft. Stanolind's Candelari 1, Clinton area, Reels & Trobough sur, comp 8101 ft, 5 bbls per hour 48 gravity distillate, 10,000,000 cubic ft gas.

JEFFERSON COUNTY—Sun's Broussard 2, Labelle area, W. B. Burton sur, dr shale 5428 ft.

MATAGORDA COUNTY — Hammond Exploration Co.'s Croker 1, South Bay City area, E. Hall sur, dr sandy shale 6308 ft. Strake Pet. Corp.'s Sargent 1, Poole Ranch area, L. E. Parker sur, dr shale 5233 ft. Sun's Craig 2, Hawkinsville area, J. Williams sur, dr 1426 ft. Tiettes & Harris's Pierce Estate 1, Blessings prospect, J. W. E. Wallace sur, dr salt water sand 7723 ft.

TYLER COUNTY — Republic-Houston Oil Co.'s Hurd Fee 1, se of Spurger field, Norman Hurd sur, dr shale 4809 ft.

WALKER COUNTY — Page & Hartman's Carey Land & Dev. Co. 1, e of Dodge, D. McDonald sur, ru. Roswell Oil Co.'s Osborne 1, Bath Community, J. Jordan sur, sd 267 ft.

WASHINGTON COUNTY—Sun's Lauter 1, Clay Creek field, N. Clay sur, setting tubing 7465½ ft.

WHARTON COUNTY—Barnett Pet. Corp.'s Bard 1, El Campo prospect, J. M. Marford sur, abn 5555 ft. Texas Crusaders Oil Co.'s Fee 1, Magnet area, Smith & McKenzie sur, comp 85 bbls daily, 5560 ft. P. B. Watson's Sweet 1, Magnet area, Smith & McKenzie sur, washing at 5492 ft. Felmont's General Mitchell 1, Spanish Camp prospect, D. Wade sur, reported gas show 7708 ft. Shell's Seydler 1, Southeast Wharton prospect, F. Biggam sur, dr shale 4705 ft.

SOUTH TEXAS

ATASCOSA COUNTY—Frontier Oil Co.'s D&A Oppenheimer 1, 193, 4-ac tr, J. Sharp sur No. 518, 6 mi s Lytle, prep to sp. Helvetia Oil Co.'s Susie Pratt 3, 176-ac tr, F. De la Garza sur, Anchorage prospect, ½ mi se Pratt 1, dr 2710 ft. McNeill Pet. Co.'s Ada Tom et al 1, 640-ac tr, W. E. Tom sur, 5 mi ne Whitsett, abnd 1130 ft. L. G. Priest, Tr's John Sanders 1, 117.61-ac tr, J. P. Garman sur No. 1189, sd 40 ft. Rogers & Rogers' B. McLain 1, 84.8-ac tr, V. Trevino sur 79, 4½ mi Somerset, 1 mi s Somerset field, td 2013 ft, sdy sh & sd 1620-92 ft, 7 in. cas 1620 ft, swabbed dry.

BASTROP COUNTY—Joe E. Mills' Chas. W. Eskew 1, Samuel Wolfenberger sur 18, Hilbig area, dr 2690 ft. Lee F. Ross et al's J. O. Caldwell 1, 1500-ac tr, J. A. Navarro sur, 10 mi w Bastrop, dr 1970 ft, top Austin chalk 1890 ft. Paul C. Teas' Clement Vinklarek 1, 100-ac tr, A. Millet league, 10 mi s Smith Villa, dr 6655 ft, Buda lime.

BEE COUNTY — Black Development Co.'s Asa Jones 1, 286-ac tr, M. Wood sur, ab 41, 5 mi w Beeville, abnd 5010 ft. Devonian Oil Co.'s Manning 2, J. Poitevant sur 1, 5 mi w & slightly s Mineral, 1600 ft nw No. 1, dr 650 ft. Humble Oil & Ref Co.'s Mrs. M. M. McKinney 9, L. C. Randolph sur, 1¾ mi se Pettus, sd 4141 ft. W. C. McBride, Inc.'s, Theo. Plummer 1, 500 ft nel and 200 ft sel of F. J. Chessman sur, sec 33, Plummer sub, Plummer area, mim. Miller-Donzis Oil Corp.'s A. M. Holzmark 1-B, 135-ac tr, S. May sur, 1200 ft nw Holzmark's 1, Foley area, dk.

BEXAR COUNTY—Algra Oil Co.'s Edward C. Peters 1, Miguel Gotari sur 5, sec 4, 13 mi se San Antonio, sd 670 ft for pipe. American Gas Co.'s Oliver 5, 400-ac tr, M. F. Rodriguez sur, Gas Ridge, sd 3282 ft. Albert Chmel's Theresa McIntosh 1, 274-ac tr, I. W. Garrity sur No. 19, ¾ mi sw Kirby, RU. F. H. Eckert & Son's J. M. Meyer 1, 100-ac tr, Morales sur, 9 mi e San Antonio, abnd 1437 ft, top Austin chalk 1342 ft. Mayers and Smith's H. E. Bass et al 1-A, 73.5-ac tr in F. A. Ruiz sur 47, 40 ft n No. 1, near Medina river, 2 mi se Von Ormy, dr 1010 ft, 6⅝ in. cas at 975 ft. Raymond Pulliam's E. I. Lamm 2, 914-ac tr, E. Forbese sur, lcn. Woodward & Hardie's R. W. Devilbiss 1, John Devilbiss sur, 1 mi s Thelma, still sd 2284 ft. Woodward, Hardie & Herrold's Herman Sons 1, 2019-ac tr, Henry Pace League, sur 37, tr 9, Swearingen, Cassin and Tayloe subd, 28 mi s San Antonio, redr.

BROOKS COUNTY—The California Co.'s Mestina O&G Co. 1, Alta Mesa area, B. Garcia tr 5, La Mestina de Gonzlina gr, dr 2350 ft. Douglas & Burden, Inc.'s, H. A. Faller 1, C. M. Laughlin sur No. 434, Alta Verde, 1¼ mi se prod, dr 450 ft. Magnolia Pet. Co.'s Ed Lasater 1, S. Korkill sur No. 440, 9 mi w Falfurrias, coring 4675 ft.

BURLESON COUNTY—M. R. Exploration Co., Inc.'s, I. M. Fountain 2, W. Raleigh sur, blk A-47, 12 mi ne Caldwell, dr 6510 ft Red Bank Oil Co.'s Nellie Gramm 1, Eliza Santef sur, abt 2500 ft nw of company's first test, 7 mi w Creisman, cutting out stuck ds at 5928 ft.

CALDWELL COUNTY — Brown Drilling Co.'s W. I. Pope 2, Salt Flats area, 134-ac tr, John D. Rains sur, 8 mi se Lockhart, 500 ft e Pope, lcn. J. G. McKenzie's I. M. Pierce 1, S. Seal League, s of Luling, sd 160 ft.

CALHOUN COUNTY—Continental Oil Co.'s Austin 1, sec 12, blk H, Pedro Garcia sur, 1 mi n of other heaving shale wells, Seadrift prospect, sec 11, td 8825, pb, sd tr and dr to 8750 ft, pulling 6⅝ in. cas to wo.

DUVAL COUNTY—Benedum & Trees' Clara Driscoll Sevier 1, 6039-ac tr, Palo Blanquita Gr, 2 mi ne Realitos, dr 5345 ft. Mills Bennett's Ira Yates 3, sec 317, 4 mi se Labbe field, coring 3650 ft. Bridwell Oil Co. et al's E. Robles Estate 1, sur 68, ½ mi e of n end Hoffman field, td 2825 ft, snd 2810-21 ft, comp 5 bbls hr on gas device. Mills Bennett's Ira Yates 4, 330 ft nl & wl sec 467, 3 mi e Labbe field, lcn. Frank Buttram's (H. H. Coffield et al) N. L. & L. Co. 1, sur 102, 5 mi nw Eagle Hill, near McMullen County line, deepening from 1925 ft. Gilcrease Oil Co. & Tom Graham's M. S. Escobar 1, blk 4, sec 2, 829.5-ac tr, Juan Jose Manuel de la Garza Falcon gr, Buffalo Tex. subd, 2 mi sw Premont area, sp and set surf cas. F. A. Gillespie & Sons' Edwardo Perez et al 1, 160-ac tr, San Diego de Ariba gr, 3 mi w of San Diego, dr 2475 ft. W. L. Goldstone et al's J. F. Welder Heirs 1, s ¼ sur 217, 2 mi e of n end of Loma Novia field, sp. Lipscomb & Daubert's W. R. Peters 1, sur 321, 2½ mi e Lopez field, temp sd 2470 ft. McCandless & Cloyes' J. D. Sutherland 1, sec 126, 8000 ft e Sarnosa field, sp. Albert Plummer et al's Danmier 1, ne ¼ sec 58, in Copeta Garden Tracts addn No. 4, 9 mi s Realitos, dk, wait on rig. Rio Bravo Dr. Co.'s W. R. Peters 1-C, sur 398, 1¼ mi w Rancho Solo field, sd 1810 ft, little oil in hole. Rogers & Rogers, E. J. Rogers 1, 3,399.5 ft swl, 250 ft nwl of sh 2, El Mesquite gr, 2000 ft sw disc, El Mesquite area, coring 2890 ft. W. L. Wollett & M. D. Master's Bishop Duval Land Co. 1, 330 ft sl and wl of se ¼ sec 74, 1¼ mi ne Hoffman field, lcn.

EDWARDS COUNTY—Plateau O&G Co.'s Mrs. R. L. Hatch, J. W. May sur, sec 66, HE&WTRR sur, dr 2345 ft, lower 8¼ cas to 1449 ft.

FRIO COUNTY—Amerada Pet. Co.'s Halff & Oppenheimer 7, B. J. Gilman sur Pearsall, dr 5050 ft; Halff & Oppenheimer 8, 1500 ft sl, 1700 ft el of San Antonio Ditch Co. sur No. 1104, Pearsall, ru. Thornton Davis et al's Halff & Oppenheimer 1, John C. Clare sur 336, 1 mi e Pearsall chalk production, td 5618, shot with 350 qts at 5388-5618 ft, flowed 130 bbls day, now prep to acidize.

GOLIAD COUNTY — Felmont Corp.'s W. Hoff 1, 75-ac lse, BS&F sur No. 7, 3000 ft se Maetze disc well, ru. Sun Oil Co.'s Lena Fromme 1, L. A. Maetze sur, 10 mi n Goliad, dr 4416 ft.

GUADALUPE COUNTY—R. B. Byrd et al's Mrs. Jahns 1, 100-ac tr, Green DeWitt sur, lcn. W. C. Campbell et al's Katie Lay 1, on 20-ac lse, J. K. Davis sur, 800 ft e South Darst Creek, td 2470 ft, pump 40 bpd, will ac dize. Crouch et al's Mary E. King 1, ¼ mi se Zoborski area, 80-ac lse, K. D. Clements sur, ru. Chas. Culver et al's Wm. Vorphal 1, Geo. W. Edwards sur 56, 4 mi se New Berlin, td 2525 ft, top Edwards 2516 ft, set 7 in. cas 1910 ft, to test 1910-34 ft. Detroit Texas Dev. Co.'s N. J. Carter 1, 300-ac tr, 1 mi sw San Marcos River, dr 2100 ft, W. J. Dobbs et al's Gus Jahns 1, 100-ac lse, J. K. Davis sur, ½ mi ne S. Darst Creek prod, sp. Jim Harper et al's L. C. Koepp 1, New Berlin area, 95.35-ac tr Vicente sur 7, 75 ft sw Dixie Oil Co. abd test, sp and sd at 20 ft. F. P. Hynes et al's H. A. Linne 1, 224-ac tr, A. Reese sur, 12 mi se Seguin, acidized with 2000 gals 1534-1704 ft, test dry, dr 1840 ft, top Edwards lime 1769 ft. Long & Ross' Ed Feliz 1, 1½ mi s fr New Berlin, 75-ac tr, V. Duran sur, sd 570 ft. Riddle Oil Co.'s E. Nolte et al 1, J. Sowell sur, 6 mi e Seguin, td 1880 ft, 6⅝ in. cas 1780 ft, acidized, prep to test.

HIDALGO COUNTY—Earl C. Hankamer et al's Frank Rabb 1, 511-ac tr, Laguna Seca League, 5 mi sw Linn, 12 mi nw Edinburg, prep to dd from 5500 ft. McCollum Exploration Co.'s John C. Engleman Jr. 1-B, lot 8, sec 259, Tex-Mex Ry sur, 1½ mi se Pantana gasser, ru; James McDougal 1, lot 223, blk 1, La Blanca tr, 1½ mi s Pantana gasser, ru. H. J. Porter et al's Sweeney Est. 1, lot 1, Waynes Wood

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SHREVEPORT, LOUISIANA

subd No. 1, 6 mi sw Donna, junked and abnd 5260 ft, skid over for new start. Union Sulphur Co.'s ARGL&L Co. 10, blk 50, tr 2418, N. Capisallo dist, Mercedes area, td 8306 ft, still cutting out ds.

JIM HOGG COUNTY—J. H. Meek Jr.'s Martinez Est. 3-A, 1650 ft el, 1550 ft nl, sec 623, 1320 ft w Colorado field discovery, prep to move in. Pan-Ultimo Oil Co.'s (Theo. Hicks et al) Kohler 1, blk 9, Noriacitas gr, 3 mi nw Hebbonville, dr 3270 ft. Locke, Purnell & Gifford Oil Co.'s C. O. Gallagher 1-B, 40-ac tr, Randado gr, blk 190, Pippin subd, 4½ mi se Randado, coring 2975 ft.

KARNES COUNTY—R. L. Barnett's Fee 2, Alex Hunter sur, 4½ mi ne Karnes City, 800 ft se No. 1, dr 1918 ft. DeGraffe & Reele's Cochran 1, McConnell League (10 ft fr abnd well), 5 mi ne Riddleville, sp and sd. H. H. Weinert, Inc.'s, Porter 1, 700 ft n 45 degrees e Hewitt's Porter 1, ru and dr, water well.

KIMBLE COUNTY — Wilcox Oil & Gas Co.'s Hugh Spiller 1, sec 15, Brooks & Burleson sur, ab 80, abnd 3295 ft.

KLEBERG COUNTY—Clark et al's Kivlin 2, blk 8, sec 39, KT&I subd, sd 2332 ft, sand 2320-32 ft.

LAVACA COUNTY — Universal O&G Co. and Glaspie's Schubel 2, 100-ac tr, C. Fitzgerald sur, 1100 ft ne No. 1, 2 mi nw Yoakum, sd 2050 ft. Wilshire Union Oil Co.'s Albert Pohl 1, 120-ac tr, M. Wooten sur, 7 mi ne Ezzell, dr 1105 ft.

LASALLE COUNTY — Kennedy & Johnston's Gilmer & Wildenthal 1, 140-ac tr, sur No. 283, Santenis Carrasco sur 28, 8 mi se Cotulla, dk. W. H. Vernor's M. G. Jeffries 1, sec 726, HE&WT RR sur, 10 mi se Artesia, dr 850 ft.

LEE COUNTY—Fleoussa Oil Co.'s Ira Sanders 1, 330 ft sl and 300 ft el 102-ac tr, J. Von Roeder sur, dr 150 ft. James E. Pederson's C. A. Turner 1, D. Hudson sur, 1½ mi se Tanglewood, td 6560 ft, pb 4644 ft, mill out casing to sd/tr and dd.

LIVE OAK COUNTY—J. H. Durbin's Marbach 4, 429-ac tr, Stephen Hays sur, 2½ mi sw Whitsett, td 917 ft, recemented, woc. R. H. Feltner et al's Sanger Ranch 1, w ½ CC&SF sur 391, sw part of county, abnd 3570 ft. Roundtree & Posey's Turner & Toland 1, S. Hays sur, sw Whitsett, dr 520 ft. Sun Oil Co.'s J. G. James 1, 1258.3-ac. Patrick McGloin sur, ab 28, 1½ mi w Mikeska, spud in and sd to dr water well. Ohio F. O. Co.'s H. J. Rosebrock 1, 330 ft sel and swl of lse, Louis Romero sur, ne por Oakville field, mim.

MAVERICK COUNTY—I. W. Boescourt's Edson & Estrada 1, James Eaves sur 68, 12 mi n Eagle Pass, sd 590 ft. Rio Dev. Co.'s Winchester Kelso 1, 297-ac tr, sur 2, 3 mi n Eagle Pass, sd 1000 ft.

McMULLEN COUNTY—Humble O&R Co.'s H. C. Edmiston 1, sec 57, AB&M sur, 6 mi ne Seven Sisters, sp. Fred Nute et al's W. H. Fahler 1, 100-ac farm, Geo. Pittuck sur, 4¼ mi w Calliham, abnd 1013 ft, top Pettus 908 ft. L. D. Ormsby's I. W. Griffith 10, B. Sparks sur, ab 794, td 940 ft, set 5 3/16 in. 930 ft, snd 930-40 ft, completing.

MEDINA COUNTY—Toise Oil Co.'s Medina Irrigated Farms 1, lot 1, blk 32, sec 7, Medina Irrigated Farms sub, 1¼ mi e Devine, sp and sd. R. P. Whitfield's W. B. Odem 1, Henry Castro sur No. 177, ne Taylor field, ru. C. Whitting et al's Hondo Natl. Farm Loan 2, sec 214, Geo. Studer sur, ¼ mi ne No. 1, 4 mi se Hondo, ru. Will A. Wycoff's T. J. Rendele 1, 321.5-ac tr, James Barnhart sur 593, ab 1733, 8 mi s D'Hanis, dr 265 ft.

MILAM COUNTY—J. C. Kilgore's S. W. Law et al 1, 150 ft sl, 250 ft el 606-ac tr, S. Wilhelm sur, lcn. W. R. Ritchey's Chas. McDermott 1, I. R. Cockrill sur, 6 mi e Cameron, sd 50 ft.

NUECES COUNTY — Barnsdall Oil Co.'s Weil 1, lot 5, sec 7, McBride Partition between Saxet and Corpus Christi fields, abnd 7502 ft. Fearis & Cosner's Myrtle L. Stockton 1, ne ¼ sec 25, Laureles Farm Tracts, Ramon de Ynojosa sur, 12 mi sw Corpus Christi, sd 2600 ft. Hiawatha Oil Co.'s Mrs. N. I. Griffith 6, Frank sur No. 416, Saxet, dr 6405 ft. W. L. Hinds' Clara D. Sevier 1-A, sec 60, Paul subd, Driscoll Ranch, 65 ft se No. 1, 2 mi w Clara Driscoll field, sd 6000 ft, approx depth. G. M. Richardson et al's R. S. Carter 1, center nw ¼ se se¼ sec 8, Laureles Farm Tr., 8 mi s Corpus Christi, 2 mi se London, dr 3460 ft. Seaboard Oil Corp. and I. I. Allen's I. D. Chapman et al's 1, sec 80, Laureles Farm Tr., Rincon de Corpus Christi gr, 17 mi sw Corpus Christi, sd 3915 ft, dr water well. Texon Dr. Co.'s Clara D. Sevier 1, 880-ac tr, W. W. Chapman lands, Palo Alto gr, S. Agua Dulce, n offset Texon Austin, dr 6200 ft, dst 5735-61 ft, developed 200 lbs and little gasoline. WAR Oil Co.'s C. J. Hoelscher 1, blk 22, J. C. Russell Farm lots, 1850 ft se Saxet prod, td 4621 ft, set cas on btm, perf 4593-4605 ft, comp 117 bpd ½ in. ch. Wellington Oil Co. and Pan American Prod. Co.'s Clara Driscoll Sevier 1-A, Wm. Gamble sur, se Clara Driscoll field, dr 4415 ft.

REAL COUNTY—Sun Oil Co.'s Dietert & Oppenheimer 1, sec 7, GWT&P RR sur, 20 mi nw Leaky, dr 505 ft, lime.

REFUGIO COUNTY—Tidewater Oil Co.'s Landgrof 1, 220-ac tr, J. Collyer sur, n Haynes Bay, dr 5250 ft. Windsor Oil Co.'s G. W. Bissett 1, 1400 ft wl 2300 ft sl John Crockett sur, 1 mi nw Tivoli, lcn.

SAN PATRICIO COUNTY — Callaway-Crosby & Porter's White Point Dev. Co. 1, 438-ac tr, Seguin sur 4 and 5, ab 247, White Point, td 6510 ft, sd/tr, completing at 4914 ft. Eleanor Oil Co.'s Wm. Kline 1, lot 5, blk C, Coleman-Fulton Pasture Co. subd, 2½ mi se Gregory, dr 6750 ft; W. W. Toland 1, 8000 ft n Kline 1, lot 14, blk A, Coleman-Fulton Pasture subd, 2½ mi e Gregory, dk and sd. Hooper & Rutherford, Inc.'s, J. D. Willis 1, Gregory area, T. T. Williamson sur, e offset to Eleanor's Kline 1, dr 5165 ft.

STARR COUNTY—Howard Bass' Hayden et al 1, 8½, blk 4, sur 47, porc 80, 5½ mi ne Rio Grande City, coring 1380 ft. J. H. Browers' E. C. Saenz 1, sur 363, sd 150 ft. Barbara Oil Co.'s W. M. Pardue 1, 1168-ac tr, El Javali gr, 3½ mi w Cuevitas field, prep to sp. D&D Oil Co.'s (F. Davenport) Kelsey-Bass 1, Davenport subd of n 585-ac of porc 86 and 87, Camargo Juris, 2 mi w Barbacoas field, abnd 6015 ft. F. Davenport & Slick Urschel's T. B. Slick Est. 1, sec 485, 20 mi ne Rio Grande City, td 4912 ft, move in to dd. South Coast Oil Corp.'s Isabel S. Lopez 1, lot 11, sh 29-B, porc 80, 10 mi n Rio Grande City, dr 2560 ft. Sun Oil Co.'s J. F. Orr 1, por 103, Juris of Mier, M. Gonzales sur, 4½ mi s Cuevitas field, prep to mim.

VICTORIA COUNTY—Magnolia Pet. Co.'s Willie Beck 1, 132.8-ac tr, T. N. O. sur 1, 4½ mi nw Telferner, dr 1165 ft. Plymouth Oil Co.'s J. J. Welder 1, 6371.9-ac tr, S. Belding sur, ab 141, 7 mi e Nursery, ds stuck 6590 ft, working to recover; R. H. Welder 1, 6371.9-ac lse, FH&MG RR sur 15, 9 mi n Nursery, near DeWitt County line, dr 5560 ft. Portilla Drilling Co.'s P. H. Welder 6, Felipe Dimmitt sur, Hughes, dr, no depth reported.

WEBB COUNTY—French Oil Corp.'s Daniel C. Garcia 1, sur 1121, ru. Ivan Howard et al's Frost Natl. Bank 2, sur 595, 5 mi w Mirando City, dr 1740 ft. Lundell Producing Corp.'s Zaragoza Lopez 1, sec 731, 1 mi se Lopez field, sp. Mid-Continent Pet. Corp. and Oklahoma Co. of Texas, Inc's., E. T. Laubscher 1, se c 1394, 7 mi nw Webb, comp fsh job 2986 ft. H. E. Nessley's A. M. Bruni 1, sur 449, 3 mi s Killam extension to Cole field, 8 mi sw Bruni, dr 265 ft. Wilcox O&G Corp.'s Puig Bros. 1, sec 9, Loma Blanca Pasture of Joaqu'n Galan gr sur 2182 and 2183, prep to spud.

WILLIAMSON COUNTY—H. F. Goff's H. W. Kunze 1, 660 ft wl, 325 ft nl 75-ac tr, J. J. Liendo sur, sd 1330 ft. L. D. House et al's Millie Stewart 1, 151-ac tr, M. de la Villa sur, 11 mi Bartlett, ru.

ZAPATA COUNTY—B. M. Alexander Jr.'s Fee 1, 250-ac lse, 5 mi n Lopeno, lcn. W. C. Bob's J. M. G. Martinez 1, blk 22, W. R. Duke subd, Randado gr, 1 mi w Charco Redondo field, dr 365 ft. Gilcrease Oil Co.'s Antonio Trevino et al 1, blk 5, Mode subd, porc 2 and 3, 17 mi w Comitas field, dr 2760 ft.

ZAVALLA COUNTY—H. F. Wilson's T. J. Gillam 1, 330 ft nl and el sw ¼ blk A-2, GWT&T Ry sur, 6 mi ne Batesville, dr water well, prep to mim.

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NEW PRODUCTS FOR THE FIELD
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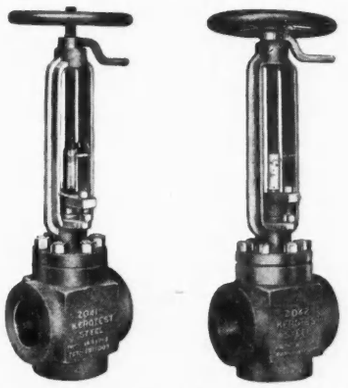
CHOKES
Kerotest Manufacturing Company

Kerotest Manufacturing Company, Pittsburgh, has developed a complete line of adjustable control chokes, especially designed to afford an economical



Kerotest Cross Type Control Choke **Kerotest Cross Type Full Flow Choke**

and efficient method of flow control on any christmas tree hookup, regardless of pressure or size.

Tested to 6000 pounds per square inch for working pressures up to 3000 pounds, these chokes are made in two general types—tee type and cross type—the bolted bonnet and the screwed bonnet design. The bolted bonnet types are designed with female inlet and outlet openings while the screwed bonnet types, include the female openings, male and female openings, and all male openings.

Cross type chokes include one design with a restricted orifice bushing for sensitive control of production under high pressure sand conditions and one of the full flow type to permit flow up to the maximum of the well tubing. These chokes are attached directly on top of the well and are provided with a full opening straight down the tubing string for the passage of swab or other equipment without removing choke from the well.

The full flow choke has an opening through the seat equal to the maximum inside diameter of external upset tubing, permitting flow of maximum production when desired. It is adjustable and can be throttled to any smaller sized areaway desired, with the diameter of such areaway clearly shown on indicator.

Bodies and bonnets of all screwed types are made of alloy steel, heat treated drop forgings. Bolted bonnet types in sizes 3-inch and smaller are also made of heavy alloy steel drop forgings while the 4-inch and 6-inch bolted types are cast of heat treated alloy steel.

The alloy steel yokes have a bronze bushing securely threaded in position precluding possibility of stem sticking or galling. The flow indicator consists of a snugly fitting brass tube pinned to stem and carries the graduated markings or scale of orifice opening in fractions.

Orifice bushing and adjusting needle are made of alloy steel hardened and ground to precision; needle is attached to stem by tightly fitting threads and locked into position with very heavy locking washer and locking pin.

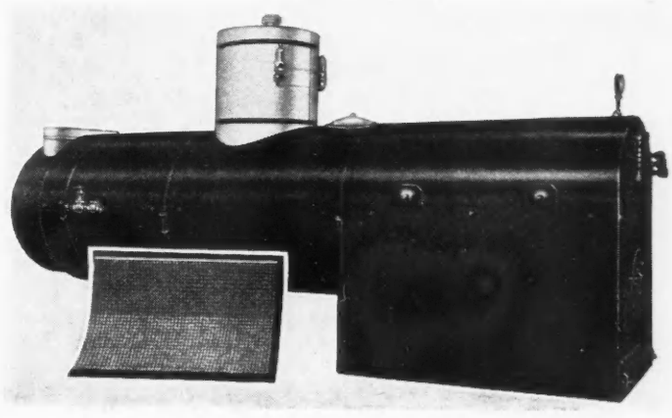
The stem operates through a hardened bronze stem nut, securely pinned into position. Stem position may be definitely maintained by means of locking wrench, which is a part of every control choke.

HIGH-SPEED DIESELS
Hercules Motors Corporation

Hercules Motors Corporation, Canton, Ohio, announces the DJX line of light, high-speed, automotive Diesels of 260 cubic inches and 298 cubic inches displacement. Like the larger Hercules Diesels, these newer and smaller engines, designed primarily for high-speed use, have the patented Hercules pre-combustion chamber which assures a clean exhaust, unusual economy and exceptional performance ability, it is claimed. The DJX Diesels are interchangeable in mounting dimensions with the JX series of Hercules gasoline engines.

Stainless Steels

Republic Steel Corporation, Cleveland, Ohio, has available a number of interesting bulletins on stainless steels. Any or all will be mailed to interested persons who state their requirements.



Boiler Insulation of Lucey Manufacturing Company, Chattanooga, Tennessee

WATER COOLING SYSTEM
Young Radiator Company

Young Radiator Company of Racine, Wisconsin, announces a new line of jacket water coolers. The line consists of two models of which there are eight different sizes.

Units are designed to cool either gasoline or Diesel engines from 29 to 122 horsepower. Units are self-contained and include cooling coil, fan, bearings, drive sheaves, pump; with all accessories made available.

The careful engineering of this new product is based on a thorough knowledge of gasoline and Diesel engine operation gained through many thousands of Young heavy duty radiators operating in the field.

Instruction Book

Landis Machine Company, Incorporated, Waynesboro, Pennsylvania, has available for distribution an instruction book giving detailed data covering collapsible taps for straight threads and receding chaser for collapsible taps for tapered threads.

Cog Belt Drives

The 1936 manual on Dayton Cog-Belt Drives for industrial distributors has had wider distribution and use than any piece of its kind the company has ever offered, according to The Dayton Rubber Manufacturing Company. The manual is called "The ABC's of V-Belts." The title gives some idea as to the treatment of the theme. The manual, while consisting of 80 pages can be digested in less than 30 minutes.

The first part of the book tells the construction story. This is handled in primer fashion with plenty of pictures and with brief text in large type, winding in and out of the illustrations. The second part of the manual points out the market for cog-belt drives. It shows over 200 pictures of a wide variety of actual installations, alphabetically arranged by industries.

Couplings

National Tank Company, Tulsa, has recently issued Catalog No. 26 describing in detail Tite-Line couplings for standard grooved end pipe and fittings. They are positive seal for pressure or vacuum and constitute a flexible high strength joint, it is claimed.

Specialties

C. A. Norgren Company, Denver, Colorado, recently issued an attractive catalog describing several specialties it manufactures. They include the sight feed automatic air line lubricator, automatic lubricators, regulating and reducing valves, automatic gas regulators, diaphragm relief valves, industrial blow valves, pop safety valves, cocks, valves, air vents, and pressure gauges.

Diamond Core Drill

Ingersoll-Rand, New York City, has available a bulletin describing its latest type diamond drill.

Arc Welding

The Lincoln Electric Company, Cleveland, Ohio, has ready for distribution its new book on "Arc Welding Design and Practice," a very comprehensive treatise on a subject that affects all branches of the oil industry. The book touches on welding methods and equipment; technique of welding; procedures, speeds and costs for welding mild steel; structure and properties of weld metal; weldability of metals; designing for arc welded steel construction of machinery; designing for arc welded structures; typical applications of arc welding in manufacturing, construction and maintenance; and advertising section. The book will be mailed postpaid upon receipt of $1.50.

Chain Hoists

The Yale & Towne Manufacturing Company, Philadelphia, has available a booklet on spare parts list and oiling instructions for all of the chain hoists it manufactures or has manufactured. Selections for parts can be made from this booklet for the oldest Yale hoists now in use.

Diamond Drill

Ingersoll-Rand Company, Phillipsburg, N. J., recently issued a very interesting four-page bulletin, No. 2231, describing the "Coroc" diamond drill. This drill is equipped with a master gauge that registers directly in pounds the pressure of the diamond bit against the rock.

Water Level Control

McDonnell & Miller, Chicago, has ready for distribution an interesting 32-page catalog describing the company's boiler-water level control. The catalog is well illustrated and gives considerable dimensional data and specifications.

Alabama Geology

Bulletin No. 43 of the Geological Survey of Alabama written by J. Brian Eby and E. C. Nicar and entitled "Magnetic Investigations in Southwest Alabama" is available through Dr. Walter B. Jones, State Geologist, University, Alabama.

Pipe Threading Handbook

Landis Machine Company, Waynesboro, Pennsylvania, has issued an operator's instruction book covering the use of its stationary pipe die heads and pipe threading and cutting machines.

Air Operated Controllers

The Brown Instrument Company, Philadelphia, has just published a new catalog on its air operated controllers for the control of temperature, pressure, flow and liquid level.

Silent Chain Drive

Morse Chain Company, Ithaca, New York, recently issued a catalog that describes the silent chain drives it manufactures. The catalog contains a large amount of data that is useful to all users of chain drives.

Explosives

Atlas Powder Company, Wilmington, Delaware, has ready for free distribution an attractive and interesting catalog that describes the explosives it manufactures. Blasting equipment also is described.

Drilling Engine

The National Supply Company, Toledo, Ohio, has issued Bulletin No. 128, describing its 14x14 Ideal steam drilling engine. A free copy is available.

Pipe Coating

The Barrett Company, New York City, has available a very interesting booklet on pipe coating specifications. The booklet is well illustrated, and gives general coating instructions for all types of underground pipe coating.

Wrought Iron

A. M. Byers Company, Pittsburgh, has ready for distribution a very interesting book on "Wrought Iron, Its Manufacture, Characteristics and Applications," which will be mailed to interested persons upon receipt of $1.00. The book gives a brief history of the development of iron in general, and follows with a more specific treatise on wrought iron.

Draw Works

The National Supply Company, Toledo, Ohio, has available bulletin No. 129, describing Ideal, Type "K" draw works, a light weight unitized model designed for drilling depths of 4500 feet.

Industrial Engines

Cummins Engine Company, Columbus, Indiana, announces availability of two new booklets dealing with industrial engines which range in power from 55 to 200 hp. One deals with fuel injection systems and the difference between the individual pump of the high pressure type and the low pressure distributor type of fuel pump.

Boiler Compound

Bloomfield Chemical Company, 169 Bloomfield Avenue, Bloomfield, New Jersey, announces availability of a booklet describing applications and functions of "Scale-Kem," a compound for prevention of scale and corrosion. The booklet is titled "Keep Boilers Efficient."

Portable Engine Drive

Oil Well Supply Company, Dallas, Texas, has for distribution preliminary bulletin No. 164 which describes the portable No. 7 double engine drive for field installation on drilling rigs.

This Week with the Industry's EQUIPMENT SUPPLIERS

National Oil Treat Company Organized

National Oil Treat Company, Inc., 306 East Locust Street, Tyler, Texas, has been organized to manufacture and distribute "Tiger Oil Treat," a newly developed paraffin solvent.

This new chemical, which was developed by J. B. Jennings, a member of the company, is said to contain no acids, and is used cold, thereby obviating any heating process for treatment.

"Tiger Oil Treat" has been in use in the East Texas field for several months.

National Oil Treat Company, Inc., is controlled by the following: J. L. Vanderver, president; J. F. Van't Hull, vice president; C. Laughlin, general manager; John Nisbet, treasurer; A. J. Fisher, secretary; and J. B. Jennings, superintendent of production.

John W. White Appointed Westinghouse General Manager

John W. White, formerly managing director of the Cia. Westinghouse Electric Internacional, S. A., with headquarters at Buenos Aires, Argentina, was appointed general manager of Westinghouse Electric Interntional Company.

Born at Indianapolis, Indiana, on January 6, 1889, White received his early education at Randolph-Macon, where he pursued an academic course, and later, while engaged with Westinghouse at its main works at East Pittsburgh, Pennsylvania, attended night courses at Carnegie Institute of Technology. White entered the employ of the Westinghouse Company in 1905 and continued at the main works at East Pittsburgh until 1912.

In 1917, he filled the position of manager of the Central Station and Transportation Divisions of the Detroit office.

His first connection with export was in 1918 when he was assigned to Cuba as Westinghouse manager with headquarters at Havana. In 1925 he was made managing director of the then Westinghouse Company of Japan with his staff office at Tokio. In 1931 he was made managing director of the Westinghouse Company in the Argentine, which position he held until his present promotion.

White will make his headquarters at 150 Broadway, New York City.

Lucey Products Corporation Puts Three Men in New Jobs

R. L. (Bud) Merrill has been transferred by his company, Lucey Products Corporation, from Oklahoma City to Shreveport, Louisiana. Merrill has been district manager at Oklahoma City, and assumes the same responsibility in North Louisiana, where the company has a store at Rodessa and offices at Shreveport.

C. C. Wimberley assumes the direction of the Oklahoma City district, with headquarters at the company's downtown office. E. A. Lynch has been advanced to store manager.

Mercury Oil Tool Successor To Allen-Oliver Company

Mercury Oil Tool Company, 11,320 South Alameda St., Los Angeles, has become successor to the firm formerly known as Allen-Oliver Company, of the same address. Several new tools are to be made. R. F. Springer continues as secretary-treasurer, and general manager. Jack S. Smith, formerly with Dean Core Barrel Company, has taken over the duties of sales manager.

Brown Made Foreign Sales Representative for Shaffer

I. Frank Brown at 30 Rockefeller Center, New York City, has been appointed foreign sales representative of Shaffer Specialty Company of Tulsa. Formerly he was foreign sales representative for Hughes Tool Company in South America and in other countries abroad.

Squeaks from the Bull Wheel

Uncle Sam's Mistake

"I wish to complain about the service."

"What is the trouble, madam?"

"My husband is in Albany on business and the card he sent me is postmarked Atlantic City."

Among Friends

"So, you vant to marry my daughter, yet? Vell, could you lend me $1,000 for a year midout interest?"

"Most certainly I could, but I von't."

"Good for you; take her, mine son."

Time Toddles On

"Well, dad," said Jimmy, the Scout, at the breakfast table, "I've done my good turn for the day."

"What?" exclaimed the father. "You've been very quick about it. What did you do?"

"It was easy," explained the boy. "I saw old Mr. Brown going for the 7:20 train, and he was afraid he would miss it; so I let our dog loose, and Mr. Brown got to the station in time."

A Practical Idea

The new refinery was built close by the headwaters of the river famous for its fine fishing. Soon sportsmen were up in arms along the river's entire length. Conditions became so bad a delegation called on the owner of the refinery.

"Something must be done," declared the spokesman. "Oil is getting into the river and is exterminating the fish."

"Sorry, gentlemen," stated the manager, "but it would be impossible to move the refinery at present and there's no way of keeping oil from seeping into the river."

The delegation demanded if there wasn't something that could be done.

"Yes, there is one thing," said the manager. "In fact, you can even take advantage of this oil in the river."

The sportsmen anxiously asked what it was they could do.

"Restock the stream with sardines," suggested the manager.

Quick Trip

Valet: "Mr. Yeagley called about his account this morning, sir."

Master: "And you told him that I'd just left for South America?"

Valet: "Yes, sir. And that you wouldn't be back till late this evening."

Silence

It was the Sabbath, and Donald was hammering away at the bottom of his barrow, when his wife came to the door.

"Mon," she exclaimed, "ye're makin' a muckle clatter. What will the neebours say?"

"Never mind the neebours," said the busy one, "I maun get my barra mendit."

The woman thought this over for a minute or two, then: "Oh, but, Donald, it's verra wrang tae work on the Sabbath," she expostulated. "Ye ought to use screws."

Vital Statistics

"How many in your family?"

"Just my husband and I."

"No children?"

"No."

"Any cats or dogs?"

"No, sir."

"Do you have a radio?"

"No."

"Have you any musical instruments?"

"Indeed not. And why all the questions? Is the government taking another census?"

"No, lady. I'm not a census enumerator. I'm just the man who intends to rent the house next door."

Impatient

Teacher—What inspired the pioneers to set forth in their covered wagons?

Pupil—Well, maybe they didn't want to wait about 30 years for a train.

All Imagination

The teacher was trying to illustrate the meaning of the word "perseverance." "What is it," she asked, "that carries a man along rough roads and smooth roads, up hills and down, through jungles and swamps and raging torrents?"

The class was silent. Then Willie, whose father was a motor car dealer, said: "There ain't no such car."

Still Looking for Work

Harry had done no work for over a year and his father was getting tired of keeping him.

"Harry," said his father, "I hear there's been a death at Johnson's factory. Why don't you go and see if you can fill the vacancy?"

Harry went. On his return he explained that he could have the job but the work was too hard for him to do.

"But," protested his father angrily, "you're a strong, fit man. If the man who died could do it, surely you could."

"It wasn't a man," replied Harry. "It was a horse!"

Quite Right

"Remember, my boy, it will pay you to be diligent in your studies. Remember, too, what you have learned no one can ever take from you."

"Well," he replied, "they can't take from me what I haven't learned, either, can they?"

Service

"And where is your daughter, Mrs. Hodge?"

"Well, to tell you the truth, mum, her was that useless in the house that I sent her out to domestic service."

A Turn About

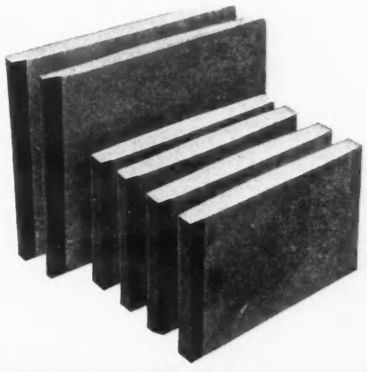
MacLaughlin had just proposed to a widow he had met recently.

"But I have nine children," she informed him.

"You deceiving wretch," he stormed.

"They're all working," she continued.

"Dearest!"



Oil Company
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available at mass production prices

Form No.	Kind of Form
100	DAILY DRILLING REPORT—1 Tour (In duplicate—100 sets to the book)
101	DAILY TIME RECORD (In duplicate—100 sets to the book)
102	DAILY GAUGE REPORT (In duplicate—100 sets to the book)
103	WELL LOG AND RELATED DATA (8½x11, Printed both sides—100 to book)
104	PIPE TALLY SHEET (In duplicate—100 sets to the book)
105	MATERIAL TRANSFER RECORD (In duplicate—100 sets to the book)
106	DAILY DRILLING REPORT—3 Tours (In duplicate—100 sets to the book)
107	OIL, GAS & MINERAL LEASE (Producers 88-Rev.—100 to a book)
108	SEMI-MONTHLY TIME RECORD (Pocket size—50 forms to book)
109	MONTHLY WELL PRODUCTION AND ALLOWABLE REPORT (25 sheets to the pad)

These forms are printed on 16-lb. bond paper. They are substantially bound. Duplicates are printed on colored bond and perforated. Pencil carbon included with each book.

After carefully reviewing the forms of a number of oil companies, The Gulf Publishing Company has made up nine standard forms listed above and has produced these in such quantities as to enable oil companies to secure them at substantial savings.

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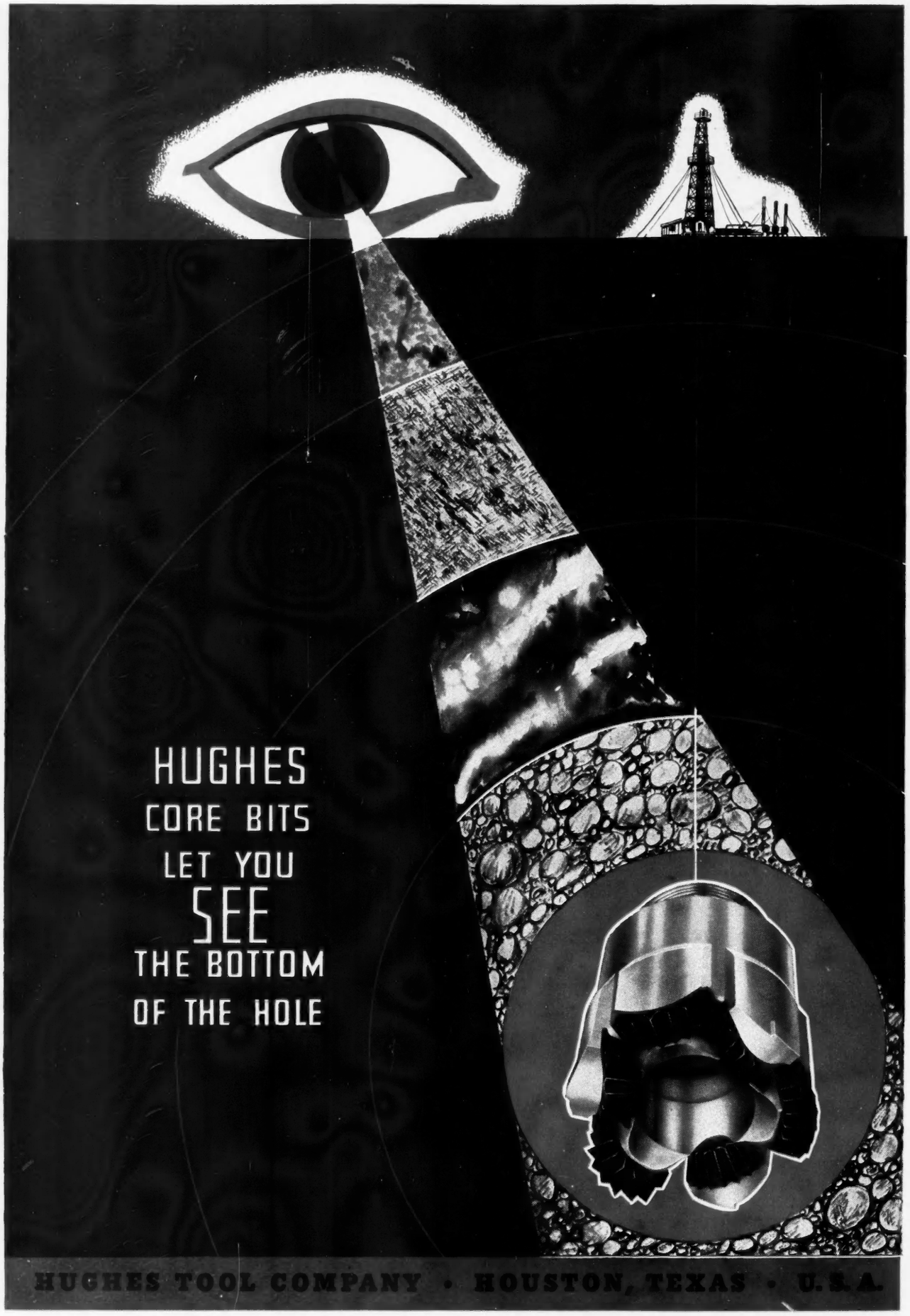
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